

**University of Puerto Rico
Río Piedras Campus
Deanship of Graduate Studies and Research**

12st Cycle – Evaluation Plan

College of Natural Sciences


**Chemistry Graduate Program
M.S. and Ph.D.**

Self-Study Document

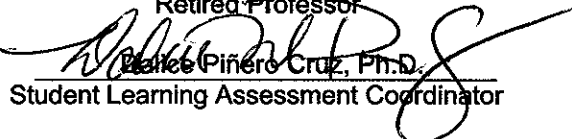
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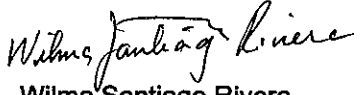

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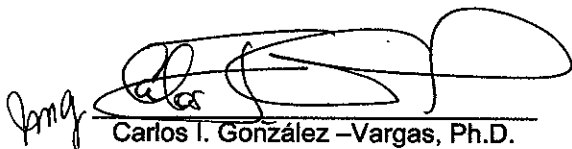

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Executive Summary

The Chemistry Graduate Program was established in 1961 offering a master's degree and added a Ph.D. degree from 1968. Since then it has awarded 195 master's degrees and 258 doctoral degrees (11 M.S. and 61 Ph.D. in the last 6 years).

During this self-study the program's main strengths were identified:

1. Preparation of professionals with deep knowledge and skills in chemistry – we have succeeded in preparing professionals who provide services of excellence in academia, industry and government and therefore they have contributed to the socio-economic development of the country. Many of the Chemistry programs at other universities in the country have been nurtured by graduates of our program.
2. Scientific productivity of professors and students - as evidenced by the high number of research papers published in refereed journals (305 in the last 5 years) and the number of presentations by students and professors at conferences in Puerto Rico and abroad.
3. International recognition - as evidenced by the high number of international collaborations and awards that students and professors have obtained.
4. External research funding - Success in obtaining external funds is evident in the over \$48 million obtained during the period covered by this self-study.
5. Recruitment of faculty - Since 2008 we have attracted six new professors, five Assistant and one Associate Professors, who have brought new ideas and research for the benefit of students and the development of scientific research in the country.
6. Research at the Molecular Sciences Research Center – Diez (10) professors doing research alongside their students in those facilities that encourage multidisciplinary.

During the self-study we identified the main weaknesses of the program:

1. Lack of a systematic recurrent evaluation and curriculum review to establish whether the goals and objectives of the program are being met.
2. Lack of a data management system that allows obtaining agile updated data about the Program. There is a need of a constant process that systematically allows the collection of data for all students and professors to keep statistics updated.
- 3; Lack of team spirit to labor together towards achieving the goals and objectives of the program.
4. Slowly response to changes in the external labor and scientific environment.
5. Excessively long time to complete the degree. The vast majority of M.S. graduate students takes 4 or more years to complete the degree, while for the vast majority of Ph.D. students it takes seven years or more. There is a possible relationship between the number of credits and other requirements and the time it takes to finish the degree.
6. Slowness in creating new courses that are part of the regular curriculum - including special topics courses that have been taught for decades.

7. Travel funds, sabbaticals and start-up funds for recruiting new faculty are not competitive, which endangers their recruitment and retention.
8. Low wages for students serving as teaching assistants are not competitive and endanger the recruitment and retention of the best students in the program.
9. Serious problems with infrastructure and safety in the Facundo Bueso Building.
10. Lack of constant access to online library resources.
11. Lack of a technology plan.
12. Lack of an attractive and updated website (our face to the outside world).
13. Lack of a Curricular Review Committee.
14. Lack of an operational budget of the program.

Recommended steps to overcome the situations encountered:

1. Curriculum revision of the Master and Ph.D. - This curriculum revision has already begun with the approval at the Department level at the end of last semester of the proposed changes of the Master program that reduce the number of credits required to complete the degree. The curriculum revision of Ph.D. is in progress.
2. Establish the 5-year Development Plan - This development plan, with the goals of recruiting professors and students, will establish the actions to be taken to ensure the attainment of the Mission, Goals, and Objectives of the program.
3. Achieving the allocation of an operational budget to the Program - Once we have the development plan we can justify the need for an operational budget to achieve the goals set in the Plan.
4. An aggressive plan of student and faculty recruitment – it will require a new website.
5. An orientation program during the first two years for students who enter the program. Establish a peer mentoring program for new students.
6. A peer mentoring program for newly recruited professors.
7. Modernising the cables for Ethernet access to the Internet in the Facundo Bueso Building and improving the wireless network.
8. Strengthen the management area and constant assessment of student learning so that they become performance monitoring tools in the program and of quick action to detect faults and make improvements to it.

We trust that all components of the Chemistry Graduate Program will work together to develop the program and advance the achievement of the Mission, Goals and Objectives.

Self-Study Narrative

I. Program Foundations

A. Accreditation - Although the Bachelors degree program in Chemistry of our campus is accredited by a professional association, the American Chemical Society (ACS), this association does not accredit graduate programs in chemistry. Therefore, our Chemistry Graduate Program is not susceptible to receive accreditation from professional associations for its Master's program and the Ph.D. Program. However, the Río Piedras Campus accreditation received from the Middle States Association of Colleges and Universities covers all graduate programs. Alumni of the Chemistry Graduate Program can exercise their profession immediately after receiving their degree, but to practice as a chemist in industry or government in Puerto Rico they must obtain a license that is granted by the Board of Examiners of Chemists of Puerto Rico, in addition to becoming a member of the College of Chemists of Puerto Rico ("Colegio de Químicos de Puerto Rico"). However, graduates with Masters or Ph.D., do not have to take the examination of the Board of Examiners of Chemists. To work in academia in Puerto Rico there is no need to be licensed by the Board of Examiners of Chemists.

B. Background – The Chemistry Graduate Program was established in 1961 offering a master's degree. Its origin is a response to the need to train professionals graduated in the chemistry field in the country. The first significant change that the program underwent was to begin offering a doctoral degree from 1968, a result of the need to develop high-level scientific research to make competitive the research on the island with the rest of the world. In addition, the expansion of the chemical-pharmaceutical industry in Puerto Rico necessitated a labor force trained in the chemical sciences.

In the six years covered by this self-study the program enrollment ranged from a maximum of 117 (2009-2010 academic year) and a minimum of 85 students (academic year 2014-2015) (see Table 4.1.A). Out of 92 new students enrolled in the program during the years of this self-study, 16 were international students (17%). The recent decline in enrollment (Table 4.1.A) reflects the decrease in the number of jobs due to the closure of pharmaceutical plants on the island in recent years.

The program maintains relationships with service centers and organizations such as the Materials Characterization Center (MCC), the University Industry Research Center, Inc. (INDUNIV), the Food and Drug Administration (FDA), the American Chemical Society (ACS), the International Union of Pure and Applied Chemistry (IUPAC), the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA).

Among the most outstanding achievements of the Chemistry Graduate Program are:

1. **Degrees granted:** During its history the program has awarded 195 master's degrees and 258 doctoral degrees. During the period covered by this self-study, 11 master's degrees and 61 doctoral degrees were awarded.

Of all graduates of the Masters Program, we have information that 45 are currently working in the industry in Puerto Rico and 11 in the United States, 6 are working in government in the United States and 64 work in academia in Puerto Rico and 7 in academia in the United States.

Of all graduates of the Ph.D. program, we have information that 130 are currently working in academia (109 universities, 21 universities abroad), 59 in industry (46 in the country, 13 abroad) and 4 in government (all US).

2. **Internationalization of the program** – Still within the recent economic constraints and challenges that we have to maintain the program competitive, the percent of international students recruited for the program has remained for the past 25 years in about 20%.

3. **Impact to the socio-economic development of the country and abroad:** Graduates of our program are successful professionals working in various academic activities, such as teaching and academic

research, or in industrial manufacturing, both in Puerto Rico and abroad. Among them are professors at major universities abroad (e.g., Luis Echegoyen - University of Texas at El Paso, Angel Kaifer - University of Miami, Carlos Crespo - Case Western University and Angel Martí - Rice University) and others who have occupied or occupy high administrative positions in government, industry or academia (e.g., José Lasalde, Vice President of Research UPR, Pius Rechani, former director of the Institute of Forensic Sciences, Roberto Aguayo, former President of the College of Chemists Puerto Rico, Raul Castro, former director of the Department of Chemistry and former Dean of Academic Affairs at UPR-Cayey, and John Colberg, Senior director at Pfizer).

4. Scientific production:

- a) professors published in peer-reviewed journals of high international recognition (Table 3.7.F) - on average about 2 publications per professor per year, exceeding many chemistry graduate programs at local and international universities.
- b) high number of presentations at scientific conferences by students and professors (Table 5.6.E and Appendix 1).
- c) collaborations - high number of interdepartmental-, intercollege-, intercampus, and interuniversity projects, with universities in the country and abroad, as well as with industries, government agencies, and research institutes (see Section III.C).
- d) distinctions - program faculty are appointed to journal editorial boards of high international prestige and as critical reviewers of manuscripts in high impact journals and of colleagues's proposals to federal and international agencies (see Section III.C). There are professors who have been elected as "Fellow" in the ACS and IUPAC, and who have been members of the Board of Directors of the ACS and the Board of Directors of the American Association for the Advancement of Science (AAAS).

5. **Proposals approved and external funds obtained** - during the period covered by this self-study we obtained over \$48 million in proposals approved with external funds.

6. **Faculty recruitment** - in the period of this study six new professors were recruited to the program (five as assistant professors and one as associate), helping to expand academic offerings and scientific production.

7. Increase in number of interdisciplinary research projects

8. **Opportunity for professors to occupy spaces in the new research facilities of the Molecules Sciences Research Center that opened in 2011** - Ten (10) professors of our program have research space in this multidisciplinary center that emphasizes basic and translational biomedical research in areas of structure and dynamics of proteins, molecular biology, genomics, proteomics, bioimages, pharmacogenetics, neurosciences, and nanotechnology and houses the Center for Materials Characterization, the Natural Products Center, the Center for Molecular Sciences for Drug Discovery, and Nikon Center of Excellence in Microscopy.

C. Vision, Mission, Goals, and Objectives of the Program (Table 1.1.C)

1. **Current situation and strengths** – The Program's **Vision** responds to the strategic plan of the Río Piedras Campus, University Vision 2016 and emphasizes to (a) achieve and maintain excellence in education, research, and dissemination of knowledge, (b) a commitment to comprehensive student training and lifelong learning; (C) the dissemination of knowledge nationally and internationally, and (d) contribute to the scientific, social, and economic development to improve the quality of life in Puerto Rico, the Caribbean, and the world.

The program's **Mission** continues to be to educate and train professionals with knowledge in the fundamentals of Chemistry as a discipline. Its purpose is to prepare professionals to practice their profession with the firm intention of advancing knowledge in chemistry, bringing this knowledge to solve problems of daily living and human welfare and its academic approach is to promote good practices in the laboratory, interdisciplinarity, and collaboration at the departmental, national, and international level. The feature that makes the program unique is that it has areas of expertise that provide an enabling experience

in a specific area belonging to one of the classic branches or emerging interdisciplinary branches such as materials science, bioinorganic chemistry, supramolecular chemistry, and nanotechnology, among others.

This **Mission** of the Chemistry Graduate Program is consonant with that of the Rio Piedras Campus with respect to providing graduate education of the highest quality that develops the capacity for independent study and research and to help strengthen undergraduate education. In addition, training of professionals of the highest caliber, committed to the ideals and values of Puerto Rican society. Similarly, developing teaching, research, and development and internationally dissemination of knowledge.

The **Program Goals** present the main responsibilities of the program which are to prepare students as competent professionals, promote research and exchange of scientific knowledge locally and internationally, meet the needs of the Puerto Rican community, and maintain a physical infrastructure with advanced instrumentation.

The **Objectives** of the Program are:

- To provide basic theoretical and practical knowledge required to function as a competent professional in the field of chemistry.
- To encourage scientific, creative, and critical research framed in the ethical - professional commitment.
- To contribute to solving issues and problems related to Chemistry and the sciences, arts and related industries.
- To advance knowledge of Chemistry and ensure human well-being by contributing ideas in solving society's problem beyond the research laboratory.
- To link the University with the global reality to improve the welfare of human beings.
- To contribute to the improvement of undergraduate programs through research opportunities, exchange of ideas, and activities with graduate studies.
- To provide chemical advice to the community, the country's educational system, the government, and industries.
- To Identify institutional and external funds to provide a physical and administrative infrastructure to support and optimize the performance of the program to efficiently serve a diverse audience of students and professionals.

2. Weaknesses – (a) A weakness of the Chemistry Graduate Program is that it does not have a systematic evaluation to establish whether the goals and objectives of the program are being met. (b) On the other hand, we have no data management system that allows getting this updated information swiftly. (c) Another weakness is the lack of team spirit to work together towards achieving the goals and objectives of the program. In these times of fiscal crisis at the campus, University, and country level, this weakness can result in detrimental effects to the program.

D. Students' Profiles and Learning Objectives (Table I.2.D)

1. Current situation and strengths – The profile of the new students includes a description of the skills that students must possess to enter the program. This profile is aligned to the objectives of learning that will continue to develop within the program which are linked to the graduate profile (**Table I.2.D**).

The Alumni Student profile includes to master the fundamental concepts of the discipline, to know how to perform laboratory techniques required by the profession, to possess the ability to communicate basic concepts of chemistry, to present in oral and written form the results of their research, among others. These

competencies and the work of these graduates are evaluated by their supervisors from the time they first participate in a job interview and through the evaluation process during the first months of the career of these graduates. This profile responds to the needs of the workforce. In the latest survey of alumni of the Chemistry Graduate Program (see **Appendix 2**), 79% of survey respondents belong to the labor force, 75% of them work full time and 70% work in an area related to their discipline. These statistics reflect that the labor market opportunities properly correspond with the alumni profile and the academic training received by participants in the program.

2. Weaknesses – (a) A weakness is that the program responds slowly to changes in the external environment. To address this weakness, the program is involved in a curriculum review process that seeks to temper the program offerings to new demands of the workplace. (b) Another weakness is that the learning objectives and their alignment with the graduate profile should be reviewed more regularly.

II. Curriculum and Co-Curricular Experiences

A. Study Program (Table 2.1.A); B. Courses and Learning Experiences (Table 2.2.B); C. Content and Curricular Revision

1. Current situation and strengths – The Master's program requires to (a) approve 41 credits; (b) pass two (2) out of three (3) qualifying exams, one of them with an A grade, in the first summer after the first year of study; (c) approve a thesis research proposal (Proposal A); (d) perform graduate research and pass a minimum of 12 research credits (included in the 41 total credits required by the program); (e) participate in meetings of the research group; and (f) to make a presentation and oral defense of the Master's thesis based on the research results (see **Table 2.1.A**).

The Ph.D. program requires to (a) approve 74 credits; (b) approve three (3) qualifying exams, two of them with an A grade; (c) approve a thesis research proposal (Proposal A); (d) pass a graduate seminar; (e) approve a research proposal not directly related to their research area (Proposal B); (f) participate in meetings of the research group; and (g) to make a presentation and oral defense of a dissertation based on the results of the doctoral research (see **Table 2.1.A**).

The full-time curricular sequence for the Master's is designed so that all requirements can be completed within two years, while for the Ph.D. it is designed to complete all requirements in four years. The reality shows that the time it takes students to complete these degrees is much more than the time proposed (see **Table 4.8.C** and **Table 4.8.D** and the weaknesses section below).

However, the survey administered to alumni of the program shows that only 11% express dissatisfaction with the preparation offered by the program to be successful in their professional careers. Therefore, the external scientific community that evaluates and recruits them for jobs in industry, government or academia understand that the curricular content of our program is a solid one that successfully prepares our alumni.

89% of respondents to the alumni survey (**Appendix 2**) believe that the number of credits required in courses is satisfactory; this percentage drops to 54% among current students in the program (see survey of students in **Appendix 3**) and between faculty only 36% is satisfied with the number of courses' credits required (see faculty survey in **Appendix 4**). 75% of respondents to the alumni survey believe that the amount of other requirements required is satisfactory. 85% of alumni and 70% of current students expressed satisfaction with the requirement of Proposal A research thesis as a learning tool for organizing and planning of the thesis project. 92% of professors understand that Proposition A is necessary to develop critical thinking and the ability for independent study and research and 100% believe that Proposition A is a learning tool that facilitates the organization and planning of the thesis project. 82% of graduates believe that Proposition B is a learning tool for solving problems and conducting independent studies into new areas of discipline as preparation for a career; the percentage is only 44 for students. Among professors, 50% understand that Proposition B is needed to develop critical thinking and the ability for independent study and research and 71% think it is a learning tool to solve problems and to carry out independent studies in areas new discipline as preparation for a career. 56% of students and 52% of graduates are satisfied with the qualifying exams as a measure of a student's ability to pursue graduate studies at Masters level or Ph.D. Among professors, 79% say the qualifying exams are necessary to develop critical thinking and the ability for independent study and research. 69% of students, 59% of graduates and 57% of

professors believe that the depth of the regular courses after the core is satisfactory, 57% of graduates and 58% of students believe that the curriculum provides the knowledge and skills necessary to succeed in a career. On the other hand, 58% of students, 57% of graduates and 43% of professors understand that the courses prepare them with the knowledge and skills necessary to successfully carry out research at the graduate level.

A high number of students and alumni of the program believe that the program exposes them to activities and courses that allow them to develop skills such as the expertise of fundamental concepts of chemistry, its applications and relationship with other disciplines (72% students and 86% graduates, respectively), critical thinking (67% and 75%, respectively), knowledge of relevant scientific literature and the ability to use it to solve problems (73% and 85%, respectively), the ability to become a specialist in one field of chemistry (70% and 85%, respectively), practicing ethical conduct in their professional career (64% and 67%, respectively), the ability to conduct independent research (59% and 57%, respectively), expert technical skills required of a professional chemist (54% and 82%, respectively), oral communication (60% and 61%, respectively), occupational safety, safety laws and regulations for environmental protection (57% and 50% respectively), solving problems related to the research (51%, 57%, respectively), and thinking and interdisciplinary knowledge (51% and 54%, respectively).

Among the alumni and students surveyed, many believe that the program exposes them to activities and courses that allow them to develop skills such as carrying out work as a team including in various scenarios (46% of graduates and 58% of students), written communication (39% graduates, 51% students) and the design and development of a research project (57% graduates, 54% students).

Changes in graduation requirements that have been carried out in the program have helped to expedite students to start doing research much earlier by having to present the Proposal A of their thesis research projects and introducing them to the search of information in the scientific literature.

2. Weaknesses – (a) **Tables 4.8.C and 4.8.D** show that the time to complete the degree is too long. The vast majority of graduate students takes 4 or more years to complete the degree, while for the vast majority of Ph.D. students it takes seven years or more.

To know the opinion of people linked to the program about this issue, surveys were administered to alumni (Appendix 2), current students (Appendix 3) and professors (Appendix 4) that included questions about the curriculum, courses and learning experiences, and curriculum content and review. Although the curriculum sequence is designed for students to complete the master's degree in two years and the Ph.D. in four years, the reality is different. The survey administered to alumni of the program reflects that none of them completed their degree in four years or less, 28% took 5 to 6 years to complete, 44% took between 7 and 8 years, and 28% took 9 years or more. 67% of alumni are not satisfied with the time it took to complete the degree, while among students currently in the program, 59% of them are dissatisfied with the time it will take to complete the degree. The survey conducted among professor reflects that 65% understand that the time to complete the degree is very long, and 71% understood that the current curricular sequence affects the time it takes to complete the degree.

(b) Of the students currently enrolled in the program only 36% are satisfied with the curriculum; while 41% of alumni of the program find the curriculum deficient; (c) 64% of students in the program expressed not be satisfied with the amount of other degree requirements; (d) only 30% of students in the program expressed satisfaction with the seminar as a learning tool for troubleshooting and to conduct independent studies; (e) only 31% of students in the program expressed satisfaction with the frequency with which special topics courses are offered; and (f) only 39% are satisfied with the frequency of regular courses offered are the core courses.

(G) Only 36% of students find that the scope and diversity of the graduate courses are satisfactory and only 42% of students are find satisfactory the curriculum and the curricular experience. Similarly (h) only 30% of the students understand that the graduate seminar is an effective learning tool to solve problems and to carry out independent studies and (i) only 30% understand that the courses prepare them to write a thesis.

(j) On the other hand, a high percent of students believe that the program does not expose them to activities and courses that allow them to develop: (i) oral communication skills (39%), (ii) social responsibility (51% and 52% among alumni), (iii) mathematical reasoning (51% and 36% among alumni), (iv) leadership (55% and 50% among alumni), and (v) statistics (60% and 58% among alumni).

(k) Among the surveyed professors it is low the percent who believe that the program exposes students to activities and courses that allow them to develop skills such as (i) to carry out written communication (7%), (ii) interdisciplinary thinking and knowledge (43%), (iii) mathematical reasoning (21%), (iv) statistical skills (8%), (v) expertise in occupational safety, safety laws, and environmental-protection regulations (29%) and (vi) to have tools for practicing ethical behavior in their professional career.

(l) A large number of special-topics courses that cover emerging areas of the discipline have been created in the program. However, the most successful special-topic courses have not become part of the regular curriculum. On the other hand, the program does not have a course in Scientific Communication at the graduate level.

D. Admission Requirements (Table 2.3.D)-

1. Current situation and strengths – The admission requirements are: (a) a minimum grade point average of 3.0; (B) the GRE exam in the discipline, (c) an essay about why they should be admitted, (d) an interview (optional), (e) research experience (optional), and (f) letters of recommendation.

Admission requirements have proved adequate to identify suitable candidates for the program, particularly research experience, letters of recommendation, and the essay about why they should be admitted. However, the correlation between incoming GPA (from their undergraduate chemistry courses) and the score on the GRE (Chemistry) reflects a slight tendency that the higher the GPA and score on the GRE it is more likely that the student will finish the degree. Overall, the average GPA for all years included in this analysis for alumni is 3.2 while the corresponding average of those who did not completed the degree is 3.0. (see chart in **Section II.D**). 70% or more of the admitted and enrolled students successfully complete the program.

2. Weaknesses- We do not have a single suitable predictor to identify which of the admitted students may successfully complete all requirements.

E. Graduation requirements (Table 2.4.E) -

1. Current situation and strengths – Graduation requirements are included in the Bylaws of the Chemistry Graduate Program approved in 2009 (see **Appendix 6**) and include a minimum GPA of 3.0, the required credits (41 for the Master's and 74 for the Ph.D.), an candidacy exam, a research project, to pass qualifying exams (an A and a C, minimum for a Master's and two A and one C, minimum for the Ph.D.), a graduate seminar for Ph.D. candidates and a dissertation and defense of the doctoral dissertation or Master's thesis. We are currently conducting a review of the program curriculum that could produce changes in graduation requirements in order to adjust to Certification number 38 of the Academic Senate, Academic Year 2012-2013. The curriculum change at the level of Master's in chemistry was approved at the end of the past semester by the Chemistry Graduate Program and the Department of Chemistry and lowered the minimum number of credits for the degree from 41 to 30 credits. The Committee of Academic Affairs of the Graduate Chemistry Program is working on the proposed change curricular for the Ph.D.

2. Weaknesses - The Professors' survey (**Appendix 4**) shows that 64% of respondents understood that the number of credits required in courses is not satisfactory, 71% believe that the current curricular sequence affects the time it takes to complete the degree, and 86% understand that the time it takes to complete the degree is not satisfactory. Although alumni and students surveyed are satisfied with the number of graduation requirements, most understand that the time it takes to complete the degree is too long.

F. Analysis of the Curricular Design-

1. Current situation and strengths – In terms of the approval of courses students meet the stipulated time

to meet those requirements, while not with other requirements. The course sequence is distributed with core courses in the first year, which are requirements for specialty courses. The core courses do not include all the knowledge and skills that are fundamental, but they do include the main ones. It is understood that students enter with substantial fundamental knowledge. The curriculum revision (already approved at the Graduate Program and the Department level for the Master's and in the design stages for the Ph.D. proposal) reduce the time it takes for the student to complete their degree requirements. The implementation of the next development plan will help students to plan ahead their curriculum with at least two years in advance.

The vast majority of the enrolled students are prepared to meet the requirements of the program judging from the retention and graduation data. This implies an appropriate relationship between admission and degree requirements conducive to satisfactory performance in the program, facilitating obtaining the degree.

Emerging research topics presented in the courses encourage students to consider interdisciplinary scenarios. In addition, graduate seminars provide exposure to issues and interdisciplinary knowledge that students subsequently apply in their research. The program has internship opportunities in external research centers that provide expertise and co-curricular interdisciplinary learning to students. Existing collaborations between local and external researchers promote interdisciplinary learning. The program provides for students to participate in internship experiences in academic and industrial research laboratories in Puerto Rico and abroad. The next Development Plan and curriculum review seeks to cross disciplines' boundaries in all areas of science.

The program also promotes participation in scientific conferences that expose and develop in students interdisciplinary knowledge and learning. One of the requirements of the curriculum is for students to present their findings at conferences and to publish in peer-reviewed journals contributing to the development of their discipline.

In relation to the areas of ethics and research safety, students take an ethics workshop during the orientation and training activity held before starting on the program. The workshops on safety and waste management also provide for students to develop social and civic awareness.

2. Weaknesses – (a) The requirements of graduate seminars and proposal have lengthened the time to meet those requirements. (b) The specialty courses contain a heterogeneous distribution of essential knowledge of the discipline. This hinders integration in the distribution of content, which will be one focus of the next Development Plan.

G. Academic offer (Table 2.5.F) -

1. Current situation and strengths- The core courses (6000 level) are offered annually, while the 8000 level courses are mostly offered in alternate years. The survey administered to alumni of the Chemistry Graduate Program (see **Appendix 2**) shows that 50% expressed satisfaction with the frequency with which regular courses are offered after the cores courses, while in the survey administered to current students in the program (see **Appendix 3**) this percent was 39% and was 29% among professors. Regarding the content depth of the core courses, it is found satisfactory or very satisfactory by 75% of alumni, 54% of current students and 57% of professors in the program.

Using the same surveys as a reference to assess the content depth of the directed electives (Special Topics in Chemistry), 70% of alumni respondents find it satisfactory or very satisfactory, 58% of the current program's students think alike and 57% of professors as well.

The dropout percentage of core courses fluctuates between 9 and 0% (see **Table 2.5.F**).

The demand for our courses by students of the Department of Physics is high, but not of the Department of Environmental Sciences and the College of Education.

2. Weaknesses – (a) In the period covered by this study no course has been created, modified, or deleted from the program. While this might indicate satisfaction with the current course of the program, most likely is that it respond to the fact that the Chemistry Graduate Program does not conduct systematic evaluations

of graduate courses. (b) On the other hand, the most successful special topics courses are offered recurrently in the program but have not become part of the regular curriculum, a situation that warrants to be corrected promptly, especially since many of these courses are areas of great interest and emerging scientific areas and the regular curriculum should reflect that courses in these subjects are part of our regular academic offerings.

III. *Professors/Researchers*

A. Profile of Professors in the Program (Table 3.1.A) and B. Academic Load (Table 3.2.B) -

1. Current situation and strengths- The Graduate Program has 20 professors with expertise in all classical areas of chemistry (4 in the area of Organic Chemistry, 1 in Biochemistry, 5 in Analytical Chemistry, 3 in Inorganic Chemistry, 5 in Physical Chemistry, and 2 in Chemical Education (with specialization in Organic Chemistry and Analytical Chemistry)) and emerging areas. In addition, it has adjunct professors offering courses and supervising graduate students of chemistry and who are attached to the Department of Biology (1), Department of Environmental Sciences (1), Department of Physical Sciences (1), and the Department of Biochemistry of the Medical Sciences Campus (1). All hold doctoral degrees and have postdoctoral experiences or sabbaticals, except the professors in the area of Chemical Education.

The group of professors in the program is distinguished by its diversity in terms of the place where they obtained their doctoral degree, their nationality, and research areas. In terms of the place where they obtained the doctoral degree, 11 obtained their degrees in universities in the United States with research intensive classification (Research 1), 2 in German universities, one in China, and 6 in our Graduate Program.

The diversity in professors' specialization, internationalization, and research areas offer students an experience, a wide and precise picture and vision of the present and future developments and research activities in Chemistry. In addition, they also contribute to train the student for the exercise of Chemistry in Puerto Rico and other countries. Furthermore, they also promote research and the exchange of scientific knowledge with local and international peers, in full accordance with the mission and vision of the program.

When comparing the total number of professors in the Graduate Program with other graduate programs in the United States, the following is observed. Comparing with New Mexico State University, which ranks 131 according to the 2014 classification of US News and World Report, it employs in its staff 17 professors and a support staff of 8 people charged with secretarial, administrative, and chemical storage tasks. In this classification the UPR-RP Chemistry Graduate Program occupies the position 138. On the other hand, if we are to transform the graduate program into a more competitive one and be among the top 50 programs we could compare with the program which occupies the 49 th position, the one at Florida State University, which has a staff of 36 professors and 35 support staff.

A majority of professors is assigned an academic load of a graduate course or an undergraduate course with 3 credit hours and 2 credit hours of the Research Seminar course (see **Table 3.1.A**). This load allow professors to develop their research, improve performance and productivity in it and in teaching, and effectively supervise their students in their thesis projects. This productivity is reflected in the number of publications and annual presentations (**Table 3.3.c**).

2. Weaknesses – (a) A weakness is that only 25% of professors in the Chemistry Graduate Program are women. This contrasts with 32% of professors in the Department of Chemistry who were women in the 2011-2012 and 2012-2013 Academic Year, as reflected in the results of the latest survey on this subject by the American Chemical Society (see <http://cen.ag/wfcity>). However, the survey showed that for the academic year 2012-2013 among the Departments of Chemistry in the United States, the percentage of women with tenure or tenure-track appointment was only 18%, and the 32% in the Río Piedras Campus of the University of Puerto Rico was the highest percent among all universities included in the survey (as it was also for the 2011-2012 academic year).

(b) A review of the teaching staff of our program highlights the immediate need to increase the number of professors in the areas of Biochemistry, Organic and Analytical Chemistry. The highest priority is in the area of Biochemistry which has resulted in a decrease in academic offer of advanced courses in this area

which in turn expands the student's graduation time and research opportunities for students.

(c) The average number of the years of service of professors in the program is 18, indicating that we will reach a high proportion (50%) of professors with enough years of service (25 or more) to qualify for retirement within the next 5 years. This situation must be addressed in the Development Plan with an active and aggressive recruitment plan to maintain diversity and competitiveness in research topics, curricular offering, and research opportunities for students. In addition, this should result in a more homogeneous distribution with respect to years of service and experience of professors in the Program.

C. Research Projects and Creative Labor (Table 3.3.C) -

1. Current situation and strengths –

Table 3.3.C shows that all projects of professors of the Chemistry Graduate Program are in research. There is a high degree of concordance between the research interests of each professor during the past years and their area of expertise. However, professors remain alert to new developments in research within their fields and adapt their interests to new changes, trends, and opportunities for external funding to thereby maintain high competitiveness in their field.

Besides generating new knowledge in the area of research, research directly impacts the graduate students in the program. From the moment that the student enters the program he/she is encouraged to start research by joining a research group under the supervision of a mentor. The mentor presents the student with a research topic by formulating a problem for the student to develop it as his/her thesis project. During this process the mentor maintains a close relationship and supervision with the student. The process culminates with the writing of his/her thesis, presentations at scientific forums and publishing of his/her work in peer-reviewed journals. This whole process provides students with a strong academic and research preparation which enables them to compete very favorably with other US universities' graduates in finding jobs in industry, academia or postdoctoral experiences.

Professors in the Program are actively involved as critical reviewers of manuscripts in high impact journals such as ACS journals, Proceedings of the National Academy of Science, Nature Nanotechnology, among others, and proposals submitted by colleagues from other universities to federal agencies such as NIH, NSF, NASA, DOE, among others, and other international agencies such as the Israel Science Foundation. They also participate in leadership positions in professional associations such as the ACS, the Association of Chemists of Puerto Rico ("Colegio de Químicos"), AAAS, IUPAC, editorial boards of refereed journals (Lipids, Journal of Chemical Education, Chemistry and Physics of Lipids, the UPR research magazine (IN)Genios) and the Puerto Rico Chemists' Board of Examiners, among others. These requests that arise due to the recognized expertise in their fields and participation in professional activities are an excellent indicator and recognition of the degree of competitiveness and professional prestige of professors in the program in their areas at an international level.

Collaboration in research projects of the professors of the program is multidimensional extending to borders beyond the Department (multiple among colleagues), the College (with professors from the Departments of Biology, Environmental Sciences, and Biology), the Campus (College of Education), and UPR system (Medical Sciences Campus, UPR-Humacao, UPR-Mayagüez), other universities on the island (Interamerican University, Turabo University, Metropolitan University, and Caribbean Central University), and a large number of universities and research centers in countries such as Germany, Brazil, China, Spain, United States, and France, among others. These collaborations have resulted in publications and joint proposals.

The amount of external funds obtained by professors of the Chemistry Graduate Program in the six years covered by this self-study is \$ 48,972,923.00.

2. Weaknesses – The number of approved proposals decreases during the six years covered by this self-study (from 10 proposals approved in the 2009-2010 Academic Year to four (4) approved in the 2014-2015 Academic Year). However, in the 1st Semester of the current academic year (2015-2016) seven (7) proposals were approved.

D. Funding (Table 3.4.D) -

1. Current situation and strengths – The best incentive that professors and students have in their research is the commitment, dedication, genuine desire to excel and recognition in their field since the amount and type of incentive provided by the institution not it is consonant with the aspirations of having a highly rated program among the Chemistry graduate programs at an international level. Among the incentives provided by the institution and which involve professors and students we identify FIPI funds, travel funds, seed funds and part of the departmental budget (\$10,000- \$15,000 annually) is used for the purchase of gas, solvents, liquid nitrogen, dry ice, maintenance and repair of equipment, collection of toxic waste, some safety equipment for laboratories, and of paramount importance, release time.

Currently, the Department is assigned 32 teaching or research assistantships, an amount that has decreased in recent years. With the recent recruitment of 4 professors, the program has the ability to increase this number to 40.

With the limited institutional support it is extremely difficult to fund an active and productive research effort. This forces and commits the professor to manage through proposals to federal and local agencies to seek additional funding.

From 2009 to 2014-15, a total of 63 proposals were submitted (45 in basic research, 7 in teaching research, 4 for student training, and 6 for student scholarships). In the same period a total of 29 proposals were approved (22 in basic research, 1 in teaching, 4 for student training and 2 for student scholarships), reflecting a 44% success rate.

2. Weaknesses – (a) The areas of travel funds, sabbaticals, and seed funds for the recruitment of new professors (\$150,000) are limited and uncompetitive when compared with graduate programs whose classification we aim to achieve whose seed funds range from \$300,000 to \$750,000 (data provided by the Department Directors of New Mexico State University and Florida State University). Moreover, Florida State University's initial offer in seed funds includes salary for a postdoctoral student for two years that includes his/her health plan, pay for two students graduates for two years, the professor's salary for the two months of summer, travel funds to attend two meetings per year for three years and funding for instrumentation according to the researcher's needs.

(b) It is necessary to provide students recruited as teaching or research assistants a salary that is more competitive to the current \$8,720 at the Master's level and \$10,900 (ten months) at the doctoral level to attract to the program the best students in the country and international ones. This salary does not compare with that offered by other programs. For example, the salary for chemistry graduate students at New Mexico State University is \$ 21,700 for eleven months and at Florida State University is \$23,500 for 12 months. We are risking having fewer students applying to enter our Graduate Program if we can not compete with other offers that they receive from other programs.

(c) In general, a decrease is observed in the number of proposals submitted and approved through this period, however since 2015 a significant growth can be observed which can be attributed to funds sought by the newly recruited professors.

E. Student Research (Table 5.6.E) -

1. Current situation and strengths – Since 1997 the program established the rule that as a requirement for obtaining a doctoral degree the student must have at least one publication in a peer reviewed journal before graduation. Compliance with this requirement has resulted in an increase in the number of publications by students.

Out of a total of 480 students enrolled in the chemistry undergraduate program, 20% are enrolled in the undergraduate research course (Q-4999) each semester. A good number of these are involved in research programs sponsored by NIH (RISE, MARC) and NSF (GK-12, AMP, Bridge to the Doctorate), among others. The active participation of undergraduate students in research is demonstrated through their presentations at scientific meetings and presence as co-authors in publications and nourishes the investigative work of the program.

For the years that we have information the average number of publications per student published per year has been between 1.5 and 1.6. On the other hand, the average number of presentations by student that presents at conferences per year has been between 1.7 and 1.9. In the years 2014 and 2015 graduate students made 59 conference presentations and published 29 articles in refereed journals.

2. Weaknesses - A weakness of the Chemistry Graduate Program in this area is that it does not have a constant process that systematically collects these data from all graduate students to keep these statistics up to date.

F. Publications (Table 3.7.F) -

1. Current situation and strengths – Regarding publications, the main criterion in its evaluation as an indicator of productivity is the quality rather than quantity. Thus, the expectation is that the professor publishes in high impact journals two to three publications a year. In the case of newly recruited professor their contractual letters stipulate the number of publications he/she should have before consideration for tenure. All publications are made in refereed international journals. In the past 5 years (2010-2011 Academic Year Academic Year 2014-2015) professors have published a total of 305 papers for an average of 61 publications per year and the average number of publications per year among professors that published was 5.3. This average turns out to be higher than the one reported by Florida State University of a publication per year per professor.

In addition to publishing their research in refereed journals, professors use other means to let their research be known, such as scientific conferences in their area, forums, and seminars at the local and international university community. This diversity and intensity of the research outreach has resulted in an increase in the visibility of the program at an international level, in attracting new students, in invitations to professors to give lectures at conferences, at other universities and research institutes, in the initiation of collaborations, in the request to professors as external evaluators of publications and proposals for other international colleagues and program evaluations, and in the approval of proposals and in obtaining external funds.

2. Weaknesses - A weakness of the Chemistry Graduate Program in this area is that it does not have a constant process that systematically collects these data from all professors to keep these statistics up to date.

IV. Students/Alumni

A. Admission -

1. Current situation and strengths- The program has an Admissions Committee to make decisions about students who will be admitted among students applying to the program. The student recruitment plan includes participating in graduate studies fairs, advertising campaigns, college visits, open house and visits to universities in other countries. In the six years covered by this self-study we were able to recruit 117 students (**Table 4.1.A**). All students are full-time and 50% of enrolled students come from the Río Piedras Campus of the UPR.

The Table of Distribution of the Student Population (**Table 4.1.A**) reflects that the selectivity percent of the program on average is 57% for male students and 73% on average for female students. The attraction percent on average is 70%, which we consider satisfactory.

For 4 of the years included in this self-study the distribution was equitable between the enrollment of male and female students. However, in the 1st year and in the last year included in the self-study, there is a higher percent of females. The program is diverse in terms of the origin of students, including students from Latin America, the Caribbean, Asia, and Africa (see **Table 4.2.A**).

Learning from other cultures takes place spontaneously when the integration of students with different cultural backgrounds is achieved, which has been one of the successes of the program. To bring students from other cultures with commitments, lifestyles, study methods, and teaching approaches different to our own increases competitiveness of the program as students contribute in their courses both in the

construction of ideas and the formulation and analysis to scientific questions in various forms. As a result, students in the program have the opportunity to enrich their analytical skills, increase their vision of what other programs in other countries provide and familiarize themselves with the reality of the social problems facing other parts of the world.

2. Weaknesses – (a) The number of students has decreased over the past three years. However, in the year 2015-2016 the number of students admitted and enrolled in the program doubled.

(b) In the last three years a decline is also seen in the number of applicants.

B. Student Retention (Table 4.3.B)-

1. Current situation and strengths- There was a low percent of student retention in the period covered by this self-study (between 100% and 36% retention in the 2nd year in the program and between 64% and 20% retention in the 3rd and 4th year, see **Table 4.3.b**) that is discussed below in the section of weaknesses.

A strength has been that the offer of economic incentives by the UPR during that period of six years covered the entire demand for financial assistance made by students. As seen in **Table 4.7.B** all students in the program who requested assistantships and scholarships obtained them. The percent of students in the program who obtained financial incentives (assistantships or scholarships) during the six years covered by this self-study fluctuates between 80 and 91%. However, obtaining teaching assistantship is no guarantee of not having economic needs, given the low wages that give these assistantships give (see discussion below under weaknesses).

2. Weaknesses - Table 4.3.B reflects a low student retention in the first two years of the period covered by this self-study. For the cohort that entered in 2009-2010, only 36% enrolled in the 2nd year and 31% in the 3rd and 4th year. For the cohort that entered in the 2010-2011 academic year, only 50% enrolled in the 2nd year and 20% in the 3rd and 4th year. This situation of low student retention was repeated in the cohort of the 2013-2014 academic year when only 53% of students in that cohort were retained in the 2nd and 3rd year in the Program.

In the 2011-2012 cohort retention percent to the 2nd year was high (94%), but fell to 50% for the 3rd year and 44% for the 4th year, while for the 2012-2013 cohort retention was complete (100%) for the 2nd year, but fell to 64% for the 3rd and 4th year. The last cohort that includes the period of this self-study is the cohort of the 2014-2015 Academic Year, and this was 100% retention in the 2nd year, which is the current year.

The low retention percent reflected in the early years covered by this self-study we believe are a result of student strikes that affected the campus at the end of the 2009-2010 Academic Year and in the middle of the 2010-2011 Academic Year, which caused many students to decide to abandon the program. Other reasons that cause students to not complete the program are prolonged absence, voluntary departure, academic suspension due to academic average, health difficulties, and lack of economic resources. There have also been students who have reported that they have decided not to complete the program because of frustration of not being able to complete their thesis work because there is instrumentation that is not in operation due to lack of maintenance due to cuts in allocations for those purposes that the Department and the Faculty have had in recent years.

Irrespective of this, the data show that once students reach their second year, retention usually remains stable. Therefore, we must emphasize support and guidance to students in those first two years in the program to bring up the percentage of retention.

It is interesting to note how these retention data compare with economic incentives data for graduate students. Although the percent of students who get financial incentives is high, the teaching assistantships granted in this campus are with too low salaries, causing a difficult economic situation for adults such as our graduate students who do not necessarily live with their parents. While students recruited as teaching or research assistants receive a salary of \$8,720 at the Master's level and \$10,900 at the doctoral level (ten months), salary for graduate students of chemistry at New Mexico State University is \$21,700 for eleven months and at Florida State University is \$23,500 for 12 months. With the difficult economic situation in our country, if we cannot increase the salaries of teaching assistants we are threatened with more students

taking the decision of not completing the program because what they receive in salary is too low.

C. Graduation -

1. Current situation and strengths – Tables 4.8.C and 4.8.D reflect the large number of years it takes students to complete the degree. Students confront several problems to complete the degree in the time stipulated in the curriculum such as strikes on campus, hurricane consequences, equipment without the required maintenance, and lack of materials, among others. However, in the opinion of alumni and current students in the program, even with the long time it takes to complete the degree, students feel prepared to face the labor market once they finish their degree.

2. Weaknesses - The vast majority of Master's students takes 4 or more years to complete the degree, while for the vast majority of Ph.D. students takes seven years or more. For Ph.D. students the average number of years it takes to complete their degree is between 8 and 10 years. The curriculum review being carried out at present in the program should reduce this problem by lowering the number of credits required to complete the degree.

D. Alumni

1. Current situation and strengths – All students who complete the program are followed by first asking all of them to fill an information sheet when they handle in their bound thesis, and by regular mail, email, and telephone. According to the survey of alumni (see **Appendix 2**) program alumni are employed in industries in the private sector (33%), in academia (58%), and government (8%). It takes them about a month to get a job. Of the 33 people who completed the survey of alumni (see **Appendix 2**) 72% have full time jobs and 20% part-time. Among the alumni, 56% work in the field in which they specialized, while 44% work in another field. 17% of alumni are paid about \$80,000 per year and 38% between \$50,000 and \$79,999. Every year 80% of program alumni continue further studies.

For academic counseling, the newly recruited students are provided through the website of the Deanship of Graduate Studies and Research (<http://graduados.uprrp.edu>) and the Regulations of the Chemistry Graduate Program (see **Appendix 6**) the requirements, regulations, and institutional services on Campus.

Situations or complaints of students are addressed immediately. These are submitted to the Graduate Affairs Committee to investigate the situation and give recommendations to the Graduate Program Coordinator and the Director of the Department. If it is necessary to take the case to the Student Ombudsperson, the student is referred to that office. The most common cause of complaints is the grade point average.

2. Weaknesses – It is unfortunate that with master's degrees and doctorates, among alumni who answered that question in the survey, 29% receive at their current job a salary between \$25,000 and \$49,999, 13% between \$10,000 and \$24,999, and 4% less than \$10,000.00. This reflects the difficult economic situation in the country and worldwide.

V. Essential Resources for Teaching, Research and Creation

A. Bibliographical resources

1. Current situation and strengths – The Program, through the Néstor Rodríguez Rivera Library of the Faculty of Natural Sciences, has access to 1730 bibliographic resources whose specific subject is Chemistry and 2,996 bibliographic resources whose general subject is related to chemistry. In addition, we have 450 journals in chemistry and 5260 magazines in Science. There is also access to the Directory of Open Access Journals (DOAJ) which has 377 journals in chemistry.

On the other hand, the catalog of the Library System provides access to the catalog of the Medical Sciences Campus with 375 General Chemistry bibliographic resources and to the catalog of the Mayagüez campus with 2900 bibliographic resources whose specific subject is chemistry.

The table in Section V.A. includes bibliographic resources' acquisitions in the years covered by the self-

study. In electronic resources we have had 16 databases in total, but the total per year fluctuates between 8 and 11. Among those bibliographic resources are include ACS Publications, Annual Reviews, Elsevier, SciFinder, Springer, Web of Science, and Wiley. Electronic resources of more recent acquisition are Annual Reviews, Cambridge University Press, Chicago University Press, Institute of Physics, Oxford University Press, SAGE, SciFinder, SIAM, Springer, Taylor & Francis, and Wiley.

The amount invested in the purchase of bibliographic resources is included in **Table 5.2.B**. Although in budgetary terms the total allocated to bibliographic resources has remained more or less equal, new new resources have been acquired, but other no longer continues to be acquired. Of 8 bibliographic resources available in 2009-2010, currently there are eleven.

Print resources are ordered and mostly in good condition.

2. Weaknesses – A decrease has occurred in the acquisition of print journals, particularly in the last year covered by this self-study, probably because there is access to many of these journals electronically and because of the fiscal crisis. The fiscal crisis and its result in the acquisition of books and continuations also is reflected in this table. In the survey administered to alumni (**Appendix 2**) 42% showed dissatisfaction with the bibliographic resources available. The percent of dissatisfied among current students in the program is 31% and 29% think the same among professors (see **Appendices 3 and 4**).

To do cutting-edge research requires to have constant knowledge of the latest developments in the discipline; access to library resources is essential. The fiscal crisis has limited access to library resources for many years and although there is electronic access to important resources, is not as comprehensive as to make it suitable to develop and sustain research.

Bibliographic resources are necessary for optimal operation of the program, but they are not enough. We suggest modifying electronic access to make it more comprehensive. Existing resources are partially available. Particularly for the electronic ones, there are times when they are not available due to network problems or because the UPR is not licensed.

B. Technology Resources

1. Current situation and strengths – Table 5.4.C reflects the use of technology in the core courses, in courses for teaching assistants, in special topics courses, and in research offered by the program. Most use the Blackboard platform.

Professors engaged research in computational chemistry, such as Professor Zhongfang Chen (see <http://chemistry.uprrp.edu/chen/index.htm>) make use of computers and computer programs exclusively dedicated to their research projects. There are computers and computer programs exclusively for scientific instrumentation, some that are shared.

2. Weaknesses – (a) 38% of alumni, 28% of students and 15% of professors who took the survey found deficient the technological resources available.

The use of technology is limited by the lack of constant access to Internet network. Access to Ethernet cables is very limited in the Facundo Bueso Building where most of the offices of professors, students and laboratories of the Program are. On the other hand, there is sporadic and inconsistent access to the Campus wireless signal. There is a need to improve this access to the Internet in the building to get the most out of this tool.

C. Plan de Tecnología

1. Current situation and strengths – the program does not have a technology plan. However, the Center for Information and Technology (CITEC) of the Néstor Rodríguez Rivera Library of the College of Natural Sciences offers trainings to students, faculty and other staff on the use of technology.

2. Weaknesses - The program does not have a technology plan.

D. Analysis about technological resources

1. Current situation and strengths – Most students enrolled in the program have a laptop and do their work and access the Internet through it. The Program has no computers beyond those that the secretaries of the program have. As each of the two secretaries assigned to the program is assigned a desktop computer, if we use that number to make a calculation of the ratio of students per computer, that gives you a number of 42 for the 2014-2015 Academic Year. But the reality is that students, if they do not have laptop, use computer that professors in the program have in their laboratories.

The facilities used by alumni, students, and professors, apart from what each teacher has in his research laboratory, consist mostly of what CITEC provides in the Néstor Rodríguez Rivera Library at the College of Natural Sciences. These installations are consonant with the needs of users in offering workshops on the use of MS Office, on the creation of bibliographic records, on the use of EndNote Web, and on scholarly communication, among others. CITEC has a webpage with the list of trainings available in http://www.bcn.uprrp.edu/literacy/courses_spanish.html.

2. Weaknesses – There is a need of more adequate computer programs for the demand if they were to be used individually. However, the recent access to the MS Office 365 application through the University portal allows free use of those applications, providing access to all students.

For more specialized computer programs, we need to get more allocation of funds to update and maintain all these resources.

VI. Management, Planning, and Development

A. Organizational Structure, Policy and Procedures

1. Current situation and strengths– The program disseminates the Mission, Goals, and Objectives through pamphlets, bulletin boards, and the website of the Department of Chemistry. In the latest update of the Graduate Course Catalog it included a study program with 35 credits for the Master's, which does not match the current Master's Program that requires 41 credits. However, the curricular revision of the Master's approved by the Chemistry Graduate Program and the Department of Chemistry at the end of last semester approved a reduction of the required credits to 30 credits, to be in compliance with Certification Num. 38 of the UPR Academic Senate, 2012-2013 Academic Year.

The tools used by the program to expose or promote itself are pamphlets and the website of the Department of Chemistry that has a section for the Graduate Program. The promotion meets institutional standards. Academic Management communicates institutional regulations at meetings of the Chemistry Graduate Program.

2. Weaknesses – The promotion of the Program outside campus is poor because we do not have an updated flyer and because our website, our face to the world, is unattractive, difficult to manage to find information and is not updated. It has been informed that the College of Natural Sciences will attempt to standardize the format of the webpages of this College. We should take this opportunity to update the website of the Department of Chemistry in the part of the Chemistry Graduate Program.

B. Training

1. Current situation and strengths – Administrative and support personnel participate monthly in conferences, workshops, and professional development seminars. The administrative personnel assigned to the Chemistry Graduate Program work in the Office of Graduate Programs in the office of the Deanship of the College of Natural Sciences. All Deanship personnel take governmental ethics workshops every year, some through video presentations. All personnel are required by the government to take these ethics workshops.

2. Weaknesses – Administrative personnel are evaluated when they change from an administrative position to another. There is no known effect of the personnel evaluation on the personnel performance.

C. Recruitment

Faculty:

1. Current situation and strengths– To maintain Department productivity in publications and approved grants, the current recruitment plan (2014) seeks to replace retired professors that leave the Chemistry Graduate Program. In addition, the newly recruited faculty helps meet the teaching needs of the undergraduate program. Recently, we have recruited four new professors to tenure-track positions, one with expertise in Inorganic Chemistry (Dr. Dalice Piñero, who studies the synthesis of metal complexes and multidimensional networks for applications in Materials Science and Nanomedicine), two in Analytical Chemistry (Dr. Vilimali López, who studies the area of new polymorphs of pharmaceutical compounds using heteronucleation induced by polymers; and Dr. Eduardo Nicolau, who within the recruitment plan was appointed to work with biomaterials, catalysis, and applied nanotechnology), and one in Physical Chemistry (Dr. Pasquale Fulvio, who studies new materials with applications in energy conversion and storage and synthesis of new heterogeneous catalysts) (see discussion in **Section V.C.**).

There is still a position in Physical Chemistry that has not been filled that was announced but nobody applied. Another professor of the Division of Physical Chemistry recently retired. Of two open positions in the area of Biochemistry, they were advertized but we only managed to recruit one person who will work with the new mass spectrometers and the 700 MHz nuclear magnetic resonance spectrometer located in the Molecular Sciences Research Center.

2. Weaknesses – (A) The biggest problem facing the Program in recruiting professors is not being competitive in salary or in seed funds or in the salary of graduate students, all of which are well below the standard for institutions of "ranking" similar to ours. In amounts for travel funds, sabbaticals, and seed funds for the recruitment of new professors (\$150,000) are limited and uncompetitive when compared with graduate programs whose classification we aim to achieve whose seed funds range from \$300,000 to \$750,000 (data provided by the Department Directors of New Mexico State University and Florida State University. Moreover, Florida State University's initial seed funds' offer includes salary for a postdoctoral associate for two years that includes a health plan, salaries for two graduate students for two years, salary for the professor for the two summer months, funds for travel to participate in two annual meetings for three years, and funding for instrumentation according to the needs of the researcher).

(b) On the other hand, the salary that is offered to recruited students as teaching or research assistants is not competitive; it is currently \$8,720 at the Master's level and \$10,900 (ten months) at the Ph.D. level, which does not allow attracting to the program the best students in the country and international students that can nourish the program and the research of newly recruitment professors. This does not compare with the offer of other programs. For example, the salary for graduate students of Chemistry at New Mexico State University is \$21,700 for eleven months and at Florida State University is \$23,500 for 12 months.

D. Permanent Committees

1. Current situation and strengths – The program's Standing Committees are the Academic Affairs Committee, the Graduate Admissions Committee, and the Committee on Student Learning Assessment. All work efficiently and comply annually with the proposed tasks. The program does not have an external advisory board.

2. Weaknesses - The program does not have a Curriculum Revision Committee.

E. Community Relations

1. Current situation and strengths – There is evidence of links between the Program, the private sector, and government through the professors' research and through support for seminars and program activities. The grant programs of the Puerto Rico Science, Technology, and Research Trust incentivize such type of link; recently Dr. Carlos Cabrera and Dr. Vilimali Lopez Mejias have obtained grants from the Trust. The Faculty has direct and collaborative relationships with the Faculty of Education and its training program for science professors. The relationship between the Program and the Dean's is adequate, especially most recently when the Assistant Deanship of Graduate Studies and Research was created. The program as

such has no specific initiatives or projects with the external community, but members of the program have initiatives related to the external community through outreach programs such as the Festival de Química of the Puerto Rico Section of the American Chemical Society, Nanodays by Institute for Functional Nanomaterials, and workshops on solar energy by the Caribbean Brigade of the NSF sponsored Center for Chemical Innovation Solar Army based at the California Institute of Technology. There are also initiatives by individual professors giving environmental advice to communities with pollution problems or potential environmental contamination (e.g., in Vieques and Arecibo). Some professor also relate to the outside community through their participation in the Puerto Rico Chemists Association ("Colegio de Químicos de Puerto Rico") and participation in science fairs. The recent creation during this academic year of the students' Graduate Association of Chemistry (AGQ for its acronym in spanish), which brings together graduate students pf the Program, offers an opportunity to open new relationships with the external community. Already the AGQ organized a forum with experts from the pharmaceutical industry and the Science, Technology, and Research Trust. The program does not have Intramural Practice projects.

2. Weaknesses - There are initiatives or specific projects that could be used to create a link of the Program with the external community, in aspects of environmental chemistry and health, which have not been explored and should be done.

F. Development plan

1. Current situation and strengths - The last self-evaluation of the program was made in 2004 and we have not found a copy of a Development Plan. The Graduate Program Coordinator presents at the beginning of each academic year a work plan for the academic year which is discussed and approved by the faculty of the program.

The expectations of program development will be defined as part of the revision of the Master's and Ph.D. that is taking place during this academic year and in the exercise of developing a 5-year Development Plan as a final step of this self-study evaluation process.

2. Weaknesses – The Graduate Program Coordinator presents at the beginning of each academic year his/her work plan for that academic year, but this is not in itself a Development Plan. We understand because of the the importance of this Development Plan we should conduct a Retreat of the program professors in a relaxed but organized form to discuss the future of the Program and outline the pillars of the Development Plan.

G. Budget

1. Current situation and strengths - The program does not have its own operating budget. Its budgetary needs are partly covered by the funds allocated to the Departmental budget. Each professor in his individual character requests research funds to state and local agencies. According to the National Science Foundation, in 2013 the Department of Chemistry, Río Piedras Campus obtained 90% of funds for research and development from external funds and 10% comes from institutional funds. This compares with the Department of Chemistry at Florida State University where 70% are external funds, 30% institutional.

Alliances of individual researchers with industries such as Eli Lilly have allowed to bring some funds for lecturers, student scholarships, materials and additional equipment.

2. Weaknesse – The program should have an operational budget. The lack of funds has prevented the start of initiatives for recruitment, program development, and its students.

H. Analysis of Management, Planning and Development

1. Current situation and strengths – The Program Coordinator presented this year a work plan that besides including to carrying out the self-evaluation study, it also included the curriculum revision of the Master's and Ph.D. In addition, it included improving the relationship with the student body. In that sense program management is perceived as an agent of change.

The greatest administrative challenges that the program faces today are lack of budget and resources to update the website, buy materials for research and minor instrumentation. In addition, it needs to create an environment among students and professors to work towards the common good of all in the program..

In the development plan for the next five years that we will be working on this year as part of this self-study process we will make an assessment of the measures we must take to address these management challenges. Once approved by the faculty, they shall be submitted to the Director of the Department, to the Dean of the College, and to the Dean of Graduate Studies and Research for the implementation of the suggested measures.

2. Weaknesses - According to surveys of professors, students, and alumni, as part of this evaluation, they do NOT perceive management as an agent of change. The same surveys also show that for these three groups we have not offered an excellent service in all areas.

Among the service areas requiring special attention is the website of the Department, within which is the part corresponding to the Graduate Program, and regular guidance and mentoring to students on all program requirements.

The quality of the Program in these service areas can be increased by ensuring that the website is kept up to date and a redesign is carried out to make it more attractive and relevant to students. To improve the guidance and mentoring offered to students, we need to provide workshops for professors and students on academic offerings, rules, and regulations of the program, departmental requirements, scholarships' and assistantships' opportunities, functions and duties of the mentor, among others.

In previous evaluations of the Graduate Program they have presented basically the same problems year after year, but we have not received the expected support, particularly in additional funding, by the university senior management.

The recommendations to facilitate the operation and development of the program are:

- a. to assign a budget for the Chemistry Graduate Program.
- b. to establish a plan of constant orientation to graduate students.
- c. to provide a plan of peer mentoring for new recruited professors and for new students in the program.
- d. to update the Program website.
- e. once the five-years' Development Plan is presented, senior management should meet with program management to discuss the allocation of tasks, responsibilities, and resources to implement the plan of action to reach the expected level of excellence.

VI. *Student Learning Assessment*

A. Implementation

1. Current situation and strengths – Six (6) students participated in the assessment activities of the Graduate Seminar, while nine participated in the ones for the dissertation. In them the research and creation, effective communication, and critical thinking skills were measured. The following assessment instruments were used:

- (a) Evaluation form for graduate Chemistry Seminar y Thesis Seminar Presentation Rubric: Overall quality of science
- (b) Thesis Seminar Presentation Rubric: Quality of oral communication, Overall quality of presentation

There was no change from the original plan. There were no unexpected events, all goals and projections were achieved. The program has a Committee of Student Learning Assessment which will be dedicated to preparing the Assessment Plan for the next 5 years. They have plans for the years 2004-2009 and 2009-2010 to 2013-2014 as a model for the its preparation thereof (see Appendix).

2. Weaknesses – There was confusion about which skills are to be measured for the current year and what for subsequent years. There is a need of an annual orientation to the Committee on Student Learning Assessment so that it can perform its duties more efficiently. We also have to ensure that personnel of the the Office of Graduate Programs of the College of Natural Sciences is designated to collect data and do the initial analysis.

B. Analysis

1. Current situation and strengths – At this point we can not detect a possible relationship between student performance in research and critical thinking skills of students before starting the thesis. However, we are engaged in a curricular revision of the doctoral program that could shed light on any possible relationship. Nor can we detect a possible relationship between student performance in research and factors related to the design and implementation of curriculum and program. But we are engaged in a curricular revision of the doctoral program that could shed light on any possible relationship.

As we were informed by the Office of Student Learning Assessment, this academic year all graduate programs will implement a fourth criterion or competency for evaluation: Knowledge, skills, and abilities specific to the discipline. This new criterion will allow deeper understanding of the identified problems or more accurately identify other possible factors that contributed or hindered the achievement of the expected results.

2. Weaknesses - We have not been able to analyze a cohort of students to track their performance in all program requirements until they complete the degree, so we have not been able yet to make a comprehensive analysis of student learning.

Self-Study Form

I- Program Foundations

A. Accreditation

Although the Bachelors degree program in Chemistry of our campus is accredited by a professional association, the American Chemical Society (ACS), this association does not accredit graduate programs in chemistry. Therefore, our Chemistry Graduate Program is not susceptible to receive accreditation from professional associations for its Master's program and the Ph.D. Program. However, the Río Piedras Campus accreditation received from the Middle States Association of Colleges and Universities covers all graduate programs. Alumni of the Chemistry Graduate Program can exercise their profession immediately after receiving their degree, but to practice as a chemist in industry or government in Puerto Rico they must obtain a license that is granted by the Board of Examiners of Chemists of Puerto Rico, in addition to becoming a member of the College of Chemists of Puerto Rico ("Colegio de Químicos de Puerto Rico"). However, graduates with Masters or Ph.D., do not have to take the examination of the Board of Examiners of Chemists. To work in academia in Puerto Rico there is no need to be licensed by the Board of Examiners of Chemists.

If your program is susceptible to receiving a professional accreditation answer the following questions on this section: If not go to the next section (Background 1.B.).

1. ¿What is the complete name of the accrediting agency? If there is more than one then name all. _N/A_____

Start of the process ²	Last visit	Accreditation
<u>Month/Year</u>	<u>Month/Year</u>	<input type="checkbox"/> We obtained it: <u>Month/Year</u> to <u>Month/Year</u> <input type="checkbox"/> We did not obtain it

2. List the concerns (if any)

N/A

3. If the program can be accredited but the process has not started describe the attempts made to request it and explain the limitations to this process.

N/A

² For those that are in the process of accreditation for the first time.

B. Background

1. Provide a present description of the Program that includes:

a. How is research conducted (i.e., following researcher interests, through research centers or through established research tracks)?

The research conducted in the program is mainly structured according to the interests of the members of the program. However, we have obtained grants to establish research centers around a particular topic and the research around these areas (e.g., RISE, NASA-EPSCoR, NSF-IFN programs) is articulated. There are no established research areas.

b. Guiding principles and main schools of thought.

The Program is governed by the principle of achieving excellence in teaching and chemistry research to prepare professionals in chemistry to develop their careers in an educational or industrial environment in Puerto Rico or in the international arena. These professionals are expected to contribute to the economic, social and cultural development of Puerto Rico. The preparation of professionals in chemistry at an advanced level implies the ability to recognize important problems in the discipline as well as designing new strategies for solving them. Program graduates must exercise their profession with the highest ethical principles, to serve as examples to future generations.

c. Its context, compromise with social needs, relationships with organizations, service centers, within or outside of Puerto Rico.

The program seeks to meet the needs for economic development of Puerto Rico and the world to prepare professionals with fundamental knowledge in Chemistry and sufficient research experience in a specialized area of chemistry. The program maintains relationships with service centers and organizations such as the Center for Materials Characterization (MCC English), INDUNIV, the Food and Drug Administration (FDA), the American Chemical Society (ACS), the International Union of Pure and Applied Chemistry (IUPAC), the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Energy and the National Administration of Aeronautics and Space Administration (NASA).

2. Develop a history of the program considering the following:

a. Date and context in which the program was created

b. Its most significant achievements.

c. The most significant changes suffered since its creation and to what cause these changes responded to. (For example, curricular revision, creation or elimination of areas of specialization, offering of Ph.D., ect.).

d. How has the program addressed societal, professional and the institutional needs to whom the program responds to?

Rapid industrial development in Puerto Rico and the world from the end of World War II created the need to train professionals with master and doctoral degrees in chemistry in Puerto Rico. Responding to this need, the Graduate Program in Chemistry was established in 1961 offering a master's degree, and the doctoral program was established in 1968.

Among its most outstanding achievements is to have awarded up 258 doctoral degrees and 195 master's degrees. Another outstanding achievement has been the increasingly high number of papers published in peer-reviewed journals of high international recognition. Finally, another outstanding achievement is that our graduates successfully work in various academic activities, such as teaching and academic research, or industrial

manufacturing, both in Puerto Rico and abroad. Among them faculty at major universities (Angel Kaifer - University of Miami, Carlos Crespo - Case Western University, Angel Martí - Rice University) and others who have occupied or occupy high administrative positions in government, industry or academia (for example, José Lasalde, Vice President of Research UPR, Pio Rechani, former director of the Institute of Forensic Sciences, Roberto Aguayo, former President of the College of Chemists of Puerto Rico, Raul Castro, former director of the Department of Chemistry and former Dean of Academic Affairs at UPR-Cayey and Juan Colberg, Senior director at Pfizer.

The program has undergone significant changes since its inception in 1961. The first was to begin offering a doctoral degree from 1968, a result of the need to develop high-level scientific research for competitive research on the island and in the rest of world. The second significant change was the elimination of the requirement of cumulative exams in 1995 so that students could concentrate on scientific research. Students were required to take courses in different areas and cumulative tests to ensure that students were trained as professors in any branch of chemistry to provide service to regional colleges and private universities. The third significant change in the program was the implementation in 1997 of Proposal A so that students could articulate his doctoral studies early in his thesis proposal and thus begin their research faster. Another significant change was the recent formalization of research rotations in the first semester so as to make students choose their research mentor as soon as possible after evaluating the research carried out by at least three (3) professors of the program. Finally, in 2015 the graduate program and the Chemistry Department approved a curriculum review of the Master in Chemistry so as to be in compliance with Certification 38 of the Academic Senate, 2012-2013.

The program responds to various social, professional and institutional needs. With the expansion of the chemical-pharmaceutical industry in Puerto Rico the need for a trained workforce in the chemical sciences aroused. In addition, many regional schools of the UPR system, like private institutions, have constant need of faculty with doctoral degree in chemical sciences. Our program has provided the workforce and in doing so has increased the level of teaching, research and chemical manufacturing in Puerto Rico. The program has been very successful in meeting these needs.

The program also responds to the mission and strategic plan of the Río Piedras campus by providing the highest quality where its major elements are research and creation. The program also educates professionals of the highest caliber to meet the needs of Puerto Rico and the international community. The research program has developed recognition and international impact through publications and presentations made by the students and professors.

C. Vision, Mission, Goals and Objectives of the Program

Fill the table with the philosophical (**Vision**³ and **Mission**⁴) and programmatic (**Goals**⁵ and **Objectives**⁶) foundations that the Program has. The spaces provided in the table suggest the sequence of the required information. The Mission follows the Vision and the Goals and Objectives follow the Vision. Adjust the table to adapt it to the number of goals and objectives in your Program. Do not attempt to fix or develop foundations during the evaluation process. If these require adjustments that should be part of the Development Plan.

Table 1.1.C. Vision, Mission, Goals, and Objectives of the Program

<p>Vision³: The Graduate Chemistry Program aims to become one of vanguard, endowed with human resources (students, researchers and support staff), the infrastructure and the necessary fiscal resources to achieve and maintain excellence in education, knowledge transfer and scientific research. The Graduate Program is committed to the formation of the</p>

student of Chemistry and lifelong learning, creation and dissemination of knowledge at national and international level and the training of professionals of chemistry that promote scientific, social and economic development, to improve the quality of life in Puerto Rico, the Caribbean and the world.

Mission⁴: The mission of the Graduate Program in Chemistry is to educate and train professionals with knowledge in the fundamentals of chemistry, while providing an enabling experience in a specific area belonging to one of the classic branches or emerging interdisciplinary branches such as materials science, bioinorganic chemistry, supramolecular chemistry and nanotechnology, among others. The preparation of professionals in chemistry at an advanced level also seeks to develop in them the importance of creating a safe environment in the work area, the ability to identify major problems in the discipline and to design effective strategies for solving them by encouraging good laboratory practices, interdisciplinarity and collaboration at the departmental, national and international level. In a broader context, the mission of the Graduate Program is to prepare professionals to practice their profession with the firm intention of advancing knowledge in chemistry, bringing this knowledge to solve problems of daily life and human welfare.

Goals ⁵	Objectives ⁶
<ul style="list-style-type: none"> To prepare competent professionals whose practical and investigative approach enables them to exercise chemistry in Puerto Rico and worldwide. 	<ul style="list-style-type: none"> Provide basic theoretical and practical knowledge required to function as a competent professional in the field of chemistry.
	<ul style="list-style-type: none"> To stimulate scientific, creative and critical research framed in ethical commitment - professional.
	<ul style="list-style-type: none"> To contribute to solving issues and problems related to chemistry and related sciences, arts, and industries.
<ul style="list-style-type: none"> Promote research and exchange of scientific knowledge with local and international peers to contribute to the enrichment of knowledge in that discipline. 	<ul style="list-style-type: none"> Advance the knowledge of chemistry and ensure human well-being by contributing ideas in solving society problems beyond the research laboratory.
	<ul style="list-style-type: none"> Link the University to the global reality to improve the welfare of human beings.
<ul style="list-style-type: none"> Address the needs of the Puerto Rican community by developing projects and providing chemistry advice. 	<ul style="list-style-type: none"> Contribute by solving issues and problems related to chemistry and the sciences, the arts and related industries.
	<ul style="list-style-type: none"> To contribute to the improvement of the undergraduate programs through research opportunities, exchange of ideas and activities with graduate studies.
	<ul style="list-style-type: none"> Provide advice to the chemical community, the country's educational system, the government and industries.
<ul style="list-style-type: none"> Maintain the physical infrastructure and the advanced instrumentation that can provide the necessary support to carry out education and 	<ul style="list-style-type: none"> Identify institutional and external funds to provide a physical and administrative infrastructure to support and optimize the performance of the program to efficiently serve a diverse audience of students and professionals.

research competitive within a safety culture.	
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3

The vision is a clear image or written statement of what one would expect the program to look like in the future. This image provides the Program a sense of direction and points towards where it is heading in terms of strategic planning. .

4

The mission is an affirmation that presents the function of the Program, its reason for existing, its academic focus, (research/professional), its areas of specialization and those aspects that make the Program unique. This affirmation sets the basis for curricular development, establishing the research tracks and service areas. It defines the relationship between student training and with knowledge production and community service. It also suggests the structure and guides the functioning of the program.

5

The goals of the program are statements that expose in broad terms the responsibilities that the program has to achieve the implementation of its primary mission: to train students. The goals set the purposes from which the programmatic and management elements result. This contains either implicitly or explicitly an indicator of success. Each goal is operationalized with a series of objectives.

6

The objectives of the program are operational statements that detail the responsibilities listed in the goals of the program. They provide criteria and measurable information (qualitative or quantitative) that can be used to plan, determine progress and facilitate the program's progress. The program's success indicators stem from these objectives and consist of parameters that are usually quantitative and are used as criteria used to measure the performance of different elements of the program.

a. **Analysis**

Respond to the following questions taking as reference the information provided in Table 1.1. C.

Vision

1. **Does the program have a Vision??**
 - ☒ Yes (Go to next question)
 - ☐ No (Go to questions about the Mission.)
2. **Does the Vision define where the program is headed to in terms of its strategic planning? Does it Respond to the Strategic Plan of UPR Río Piedras, *Visión Universidad 2016*?**

Yes, the Vision of the Program defines the aspiration of where you want to go in the future in terms of strategic planning and responds to the strategic plan of the Río Piedras Campus, dubbed University Vision 2016. Particularly, responding to the strategic plan Vision University 2016 the Vision of the Graduate Chemistry Program emphasizes (a) achieve and maintain excellence in education, research and dissemination of knowledge, (b) a commitment to the formation of the student and learning for life; (c) the dissemination of knowledge nationally and internationally and (d) contribute to the scientific, social and economic development to improve the quality of life in Puerto Rico, the Caribbean and the world.

3. **Is the format of this Vision appropriate? Is it written as an affirmation or a statement in a precise and concise manner? Is it conjugated in the present tense and third singular?**

Yes, the Vision is in an appropriate format, reads as a statement, it is precise and concise, and conjugated in the present tense third person singular.

Mission

1. **To what extent does the Mission mentions the function of the program, its reason for being, its academic focus (research y/o professional), specialization areas and/or those features that make the program unique? (See footnote 4)**

According to the Mission the Program function is to educate and train professionals with knowledge in the fundamentals of chemistry as a discipline. Its purpose is to prepare professionals to practice their profession with the firm intention of advancing knowledge in chemistry, bringing this knowledge to solve problems of daily life and human welfare. Its academic approach is to promote good practices in the laboratory, interdisciplinarity and collaboration at the departmental, national and international level. The feature that makes it a unique program is that it has areas of expertise that provide an enabling experience in a specific area belonging to one of the classic branches or emerging interdisciplinary branches of chemistry such as materials science, bioinorganic chemistry, supramolecular chemistry and nanotechnology, among others.

2. **Is the format appropriate? ¿Is it written as a paragraph in a precise, concise and accessible manner?**

Yes, the Mission is presented in an appropriate format.

3. How does the Program's Mission responds to the present Mission of the Río Piedras campus?

The mission of the Graduate Program in Chemistry responds to the mission of the Río Piedras Campus with respect to providing graduate education of the highest quality to develop capacities for independent study and research and to help strengthen undergraduate education. In addition, the training of professionals of the highest caliber, committed to the ideals and values of the Puerto Rican society is contemplated. Similarly, the development of teaching and research and the international dissemination of knowledge are included.

4. Is the current Program's Mission still valid? ☒ Yes ☐ No

Explain why. If your answer is NO, then explain what will the Program do to update it.

By continuously creating knowledge, demonstrated through publications and presentations of students and professors of the program in various local and international forums, the relevance of research in solving issues of importance to society, the continued recruitment and employment opportunities with graduates of the Program at the local level and the mainland are indicative of the impact that the program continues to have.

⁷ The validity of the mission relates to the development of the profession, current requirements to exercise it, the rate of obsolescence of the field, the labor market, and the social context that frames the program.

Program Goals

1. **To what extent does the program goals outline, in broad terms, the main responsibilities of the program, the training/student learning, recruitment and teaching development, research and new knowledge production, infrastructure, management, service and community relations?**

In the program goals the main responsibilities of the program are to prepare students as competent professionals, promote research and exchange of scientific knowledge, locally and internationally, to meet the needs of the Puerto Rican community while maintaining the physical infrastructure and advanced instrumentation.

2. Does each goal have an indicator of achievement against which it is possible to demonstrate to what extent it has been reached?

Some of the goals may be proved by the number of publications and patents and the professional recruitment of our graduates. Other goals are not easy to quantitatively measure based on the indicators of achievement.

Objetivos del Programa

1. **To what extent do the Program Objectives enunciate operational actions and specific activities to be carried out to fulfil the responsibilities mentioned in the goals of the program?**

No specific activities are established although the activities to be carried out to meet the program goals can be inferred.

2. **Can it be deduced for each goal what is the indicator of achievement, i.e., they provide the objectives measurable information (qualitative and/or quantitative) though which future assessment of the operational aspects of the program is facilitated?**

These can be measured by grades, the number of publications, presentations, collaborations with industry and government, high school students participating in research, funding of professors through grants or competitive programs and the number of approved proposals.

General Questions

1. ***Do Program fundamentals (Vision, Mission, Goals, and Objectives of the Program) reflect the situation, interests, and complexity of the Program?***

Yes, the fundamentals of the program reflect the *status quo*, interest and complexity of the program.

2. **Do fundamentals provide a clear sense of direction and adequate to its circumstances that facilitate the implementation and evaluation of results?**

Yes, the fundamentals of the program provide a clear and appropriate direction which facilitate the implementation and the outcome of the evaluation (see answer to Question 2, Program Objectives).

D. Student Profiles and Learning Objectives

Fill the table with that information that you possess and align the **Alumnus Profile**¹⁰, the **Learning Objectives**⁹, and the **New Incoming Student Profile**⁸. Provide the year of approval for each in the heading of each column. If there are differentiated objectives for each sub-specialty, include them. If there is professional accreditation, align the accreditation standards (e.g., Standard D.1.a) as needed. The purpose of this table is to demonstrate the correspondence between the performance expectations established for students before, during, and after they graduate and to create awareness of the need of these fundamentals.

Table 1.2.D –Alignment of Student Profiles and Learning Objectives

Accrediting standard (if applicable)	New Incoming Student Profile (2012)	Learning Objectives ⁹ (2012)	Alumnus Profile ¹⁰ (2012)
	Successful completion of a bachelor's degree in chemistry from an accredited institution and therefore have a basic understanding of the different areas of chemistry.	Demonstrate mastery of the fundamental concepts in chemistry.	Mastering the fundamental concepts of chemistry as a discipline and its applications in daily life and the relationship with other scientific disciplines.
		Apply the concepts of chemistry by solving theoretical and practical problems that require an interdisciplinary approach.	Master the technical skills required for the exercise of his profession as a chemist.
			Master the fundamentals and technical skills of an area of chemistry such as: Analytical Biochemistry, Physics, Inorganic or Organic.
	Ability to write research reports and to orally present topics of chemistry to a wide audience.	Effectively integrate fundamental concepts of chemistry using different forms of teaching to various groups.	Have the ability to communicate the fundamentals of the discipline to various groups.
		Write publishable research (articles and a dissertation) in Spanish and /or English.	Possess ability for the oral and written presentation of research results to the scientific community in Spanish and/or English in a clear and logical manner.
	Have the ability to develop independent study, the interest and motivation to continue learning the fundamental concepts of chemistry and in his/her area of expertise.	Demonstrate ability to keep up their self-taught knowledge through continuous learning.	<p>Ability for individual learning and professional development. Have independent judgment in decision-making, creativity and initiative in finding solutions to scientific problems that might arise.</p> <p>Have the ability to recognize important problems in their areas of scientific expertise and to design strategies and/or experiments effective for solving them.</p>

	Demonstrate effective competition in oral and written communication in Spanish or English and the use of information technologies.	Correctly handle the scientific literature to support the solution of chemical problems.	Know the scientific literature and the ability to use the information thus obtained in solving problems.
		Demonstrate technical capacity to make presentations (in terms of quality and organization of ideas, the ability of argument, the quality of visual media, personal projection and time management) to a diverse scientific community in Spanish and English.	
	Have the minimum knowledge to work in a research laboratory in chemistry with knowledge of laboratory techniques and the use of classic and modern laboratory equipment.	Demonstrate knowledge of the scientific instrumentation as a support tool in solving chemical problems.	Knowing the instrumentation and technological resources as tools to support the design of experiments.
	Have the ability to teamwork.	Demonstrate mastery of relationships and interpersonal skills to teamwork with people from diverse cultural backgrounds.	Have the ability to manage relationships with people from different cultural backgrounds.
	Demonstrate knowledge of safety measures in laboratories and the proper handling and disposal of chemicals.	Identify and implement occupational safety standards and the discipline of environmental protection.	Know the rules of occupational safety and the discipline of environmental protection and the ability to apply them.
	To have shown ethical behavior during his/her years of student in solving their individual work.	To be able to incorporate new ethical standards established in their area of work and discipline.	To practice ethical behavior in their profession.
		Exhibit ethical behavior in their academic performance.	

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8 The profile for new students is a description of the competencies that students should have to enter the program. These competencies define the students' learning baseline.

Usually the programs only have a list of entrance requirements and not a profile. If the Program does not have a profile, leave this column empty.

9 The learning objectives define the operational expectations of learning for the students. They include those competencies that students should demonstrate during the course of the program, and those by which the program can infer if they are prepared or not to practice their career. They are statements or general operational descriptions that grossly the expectations that the program establishes in regard to student learning. The learning objectives serve as concrete guidelines to evaluate the effectiveness and efficiency of the program. They are written using terms of observable behaviors, starting sentences with action verbs in the infinitive. They need to align with the alumni's profile.

10 The alumnus profile is a description of the alumni of the program in agreement with the competencies that the student will exhibit when practicing, with a reasonable degree of efficiency, during the exercise of his/her career. This is sort of an archetype of the basic professional.

a. **Analysis**

Answer the following questions taking into the information provided in Table 1.1.D.

New Incoming Student Profile

1. Does the Program has a *New Incoming Student Profile* that details the baseline competencies that the student should have as a startup point in the Program? Or does it only have a list of admission pre-requisites? If the latter, then when does the Program hopes to have a final profile?

The program has a profile that incoming graduate students must have and there is a list of admission requirements.

Alumnus Profile

1. Is there a correspondence between the *Alumnus Profile* and the needs and opportunities of the job and academic market? Justify your answer.

Yes. According to the latest survey of alumni of the Graduate Program in Chemistry (see attachment), 79% of survey respondents belong to the labor force, 75% of them work full time and 70% are working in an area related to their discipline of studies. These statistics reflect that the labor market opportunities properly correspond to our graduate profile and the academic training received by the students in our program.

2. In what way does the *Alumni Profile* gather the skills and tasks that the alumnus must show during the *initial stages of his/her career*?

The graduate profile includes the mastering of the fundamental concepts of the discipline, mastering of laboratory techniques required in the profession, students must possess the ability to communicate the basic concepts of chemistry, and present in oral and written form the results of their research, among others. These acquired abilities of the graduates are evaluated by supervisors from the time he/she first participates in a job interview and through the evaluation process during the first months of their careers.

3. Is the level of requirements for the Alumni Profile in tune with the expected degree (i.e. Master's or Ph.D.)?

Yes, according to the survey administered to graduates of the program, 73% of them expressed that the standards of the program are satisfactory or very satisfactory.

4. Is the Alumnus Profile written as a list of about 10 statements that start with a verb in the infinitive (not necessarily an action verb)? If that is not the case, when will the program expects to have that profile in such format?

Yes, the graduate profile is written with a list of eleven (11) statements with infinitive verbs (see Table 1.2.D).

Learning Objectives

1. To what extent do Learning Objectives indicate the competencies that students must demonstrate during their tenure within the program?

The learning objectives were designed so that students can demonstrate their progress throughout their studies by different evaluation exercises, such as Proposal A, the Graduate Seminar, Proposal B and thesis defense. Being able to demonstrate mastery of the fundamental concepts of chemistry, application and integration of these concepts, wording in documents of investigative nature, among others (see Table 2.1.A), are the core of each of these exercises, which they can be evaluated by the thesis committee.

1. Are these measurable? Are they operationally defined, in behavioral terms?

Yes, they are measurable and defined in behavioral terms. Several are described directly and others indirectly. However, all included verbs are measurable.

2. Is their format appropriate? Do they begin with an action verb in the infinitive? Are they written according to what the student (not the professor) should be capable of doing? Are they ordered from the simplest competencies to the most complex ones?

Yes, because although they are not written in infinitive, they include action verbs. Everything is focused on what the student will be able to do, and can be sorted according to their level of complexity.

3. Are learning objectives aligned, that is to say, do they harmonize with the Alumnus Profile? Can the program infer then, that through those objectives the students should be prepared to the exercise of their careers?

Yes Table 1.2.D. - Alignment of Student Learning Objectives and Profiles shows a direct alignment between the two columns, so we can infer that the learning objectives of the program were met. Participants must leave prepared to perform satisfactorily in their careers. According to the survey administered to graduates of the program, only 11% expressed dissatisfaction with the preparation offered by the program.

4. If there have been significant changes or you foresee significant changes to the program, are those changes reflected in the *New Incoming Student Profile*, *Learning Objectives* and the *Alumnus Profile*?

In past years significant changes have occurred in the study areas of the program and major innovations are foreseen within the preparation of the Development Plan for the next five years. However, these innovations do not intend to radically change the profile of the freshman, the learning objectives and the graduate profile. We will continue to pursue a program of excellence in education and research.

General Questions

1. Up to what point is there evidence of the relationship between the New Student and Alumni Profiles and the Learning Objectives? Are there gaps between some and the others that could be having a negative effect on learning?

The criteria used in the incoming graduate students and graduates profiles with the learning objectives we see compliance and the achievement of the objectives.

Chemistry, as a discipline, is undergoing changes that foster an environment of greater interdisciplinarity in research topics and, therefore, learning, but gaps as a result of these changes are expected as the program is expanding its academic offerings due to the recruitment of new professors in the past few years whose research topics are interdisciplinary.

2. What strategies and instruments has the Program used to measure student learning and what have been the results?

Assessment tools consist of several basic departmental requirements. For students in the master program the requirements are: Proposal A and thesis defense. For students at the doctoral level a Graduate Seminar and a Proposal B is added in addition to the thesis defense. Each of these instruments has obtained favorable results in over 70% of cases, as reflected in the appraisal reports of previous years.

II- Curriculum and Co-Curricular Experiences

A. Study Program

Provide the curriculum and curricular sequence as it is approved. Adapt the lines according to the structure of the curriculum. The curriculum specifies the sequence of steps to acquire the knowledge and skills that will lead students to earn their degree; it shows expectations in terms of requirements, sequence and estimated time for compliance. The analysis of the curriculum compared to the time that truly takes students to complete their requirements, will allow you to make a more realistic assessment of the design originally established vis-à-vis the current operation of the program.

Table 2.1.A. MASTER'S DEGREE IN CHEMISTRY

Graduation Requirements*	Credits
Cursos Modulares: Choose four courses (2 of two areas of specialization) CHEM 6011 - Theory of Inorganic Chemistry I CHEM 6012 - Theory of Inorganic Chemistry II CHEM 6225 - Theory of Instrumental Analysis CHEM 6215 - Theory of Analytical Chemistry CHEM 6411 - Theory of Organic Chemistry I CHEM 6412 - Theory of Organic Chemistry II CHEM 6611 - Advanced Physical Chemistry I CHEM 6612 - Advanced Physical Chemistry II CHEM 6811 - Advanced Biochemistry I CHEM 6812 - Advanced Biochemistry II	12
Requirements in the Area of Specialization: Three group seminar courses are required in their area of specialization (one per semester, I: 1st Sem, II: 2nd Sem.) CHEM 8605 - Seminar of Physical Chemistry I CHEM 8606 - Seminar of Physical Chemistry II CHEM 8005 - Seminar on Inorganic Chemistry I CHEM 8006 - Seminar on Inorganic Chemistry II CHEM 8205 - Seminar of Analytical Chemistry I CHEM 8206 - Seminar of Analytical Chemistry II CHEM 8405 - Seminar of Organic Chemistry I CHEM 8406 - Seminar of Organic Chemistry II CHEM 8801 - Seminar Biochemistry I CHEM 8802 - Seminar Biochemistry II	6
Course as teaching assistants CHEM 6905 - TA CHEM 6906 - TA	6
Graduate seminar CHEM 8901 - Graduate Seminar I CHEM 8902 - Graduate Seminar II	2
Course Continuation of Thesis CHEM 6896 – Master Thesis Continuation	0
Electives in Area of Specialization CHEM 8XXX -	3
Electives	0
Research / Thesis CHEM 8999 - Graduate Research	12
Practice / Internship	0
Total	41

*Includes passing two (2) or three (3) Qualifying Exams and the Proposal A (thesis).

Curricular Sequence☒ Full time☐ Part time

YEAR 1	
First Semester	Credits
Courses/Learning experiences	
CHEM 6905 - TA	3
CHEM 6XXX – Core Course	3
CHEM 6XXX - Core Course	3
Second Semester	Credits
Courses/Learning experiences	
CHEM 6906 - TA	3
CHEM 6XXX - Core Course	3
CHEM 6XXX - Core Course	3
CHEM 8999 – Graduate Research	4
CHEM 800X - Group Meetings	2

First Summer	Credits
Qualifying Exams (pass two)	0

YEAR 2	
Third Semester	Credits
Courses/Learning experiences	
CHEM 8XXX – Elective in Area of Specialization	4
CHEM 8999 – Graduate Research	3
CHEM 8901 – Graduate Seminar	1
CHEM 800X – Group Meetings	2
Present Proposal A (thesis proposal)	
Fourth Semester	Credits
Courses/Learning experiences	
CHEM 8999 – Graduate Research	4
CHEM 8901 - Graduate Seminar	1
CHEM 800X – Group Meetings	2

Tabla 2.1.B. Ph.D. Program in Chemistry

Graduation Requirements	Credits
Core Courses: Choose six courses (2 of three areas of expertise) CHEM 6011 - Theory of Inorganic Chemistry I CHEM 6012 - Theory of Inorganic Chemistry II CHEM 6225 - Theory of Instrumental Analysis CHEM 6215 - Theory of Analytical Chemistry CHEM 6411 - Theory of Organic Chemistry I CHEM 6412 - Theory of Organic Chemistry II CHEM 6611 - Advanced Physical Chemistry I CHEM 6612 - Advanced Physical Chemistry II CHEM 6811 - Advanced Biochemistry I CHEM 812 - Advanced Biochemistry II	18
Requirements in the Area of Specialization: Six group seminar courses are required in their area of specialization (one per semester for six semesters, I: 1st Sem, II: 2nd Sem.) CHEM 8605 - Seminar of Physical Chemistry I CHEM 8606 - Seminar of Physical Chemistry II CHEM 8005 - Seminar on Inorganic Chemistry I CHEM 8006 - Seminar on Inorganic Chemistry II CHEM 8205 - Seminar of Analytical Chemistry I CHEM 8206 - Seminar of Analytical Chemistry II CHEM 8405 - Seminar of Organic Chemistry I CHEM 8406 - Seminar of Organic Chemistry I CHEM 8801 - Seminar Biochemistry I CHEM 8802 - Seminar Biochemistry II	12
Course as teaching assistants CHEM 6905 - TA CHEM 6906 - TA	6
Graduate seminar CHEM 8901 - Graduate Seminar I CHEM 8902 - Graduate Seminar II	2
Course Continuation of Doctoral Thesis Electives in Area of Specialization CHEM 8XXX -	12
Electives	0
Research/Disertation CHEM 8999 – Graduate Research	24
Practice/Internship	0
Total	74

Curricular Sequence☒ Full time☐ Part time

YEAR 1	
First Semester	Credits
Courses/Learning experiences	
CHEM 6905 - TA	3
CHEM 6XXX – Core Course	3
CHEM 6XXX - Core Course	3
CHEM 6XXX - Core Course	3
CHEM 8901 – Graduate Seminar	1
Second Semester	Credits
Courses/Learning experiences	
CHEM 6906 - TA	3
CHEM 6XXX – Core Course	3
CHEM 6XXX - Core Course	3
CHEM 6XXX - Core Course	3
CHEM 8902 – Graduate Seminar	1
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
First Summer	Credits
Qualifying Exams (pass three) and start research	0

YEAR 2	
Third Semester	Credits
Courses/Learning experiences	
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
CHEM 8999 – Graduate Research	
CHEM 8XXX- Elective Course	3
Present graduate seminar	3
Fourth Semester	Credits
Courses/Learning experiences	
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
CHEM 8999 – Graduate Research	
CHEM 8XXX- Elective Course	3
Second Summer	Credits
Continuation of research	0

YEAR 3	
Fifth Semester	Credits
Courses/Learning experiences	
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
CHEM 8999 – Graduate Research	3
CHEM 8XXX- Elective Course	3
Present Proposal A (thesis proposal)	0
Sixth Semestre	Credits
Courses/Learning experiences	
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
CHEM 8999 – Graduate Research	6
CHEM 8XXX- Elective Course	3
Present Proposal B (original proposal)	0
Third Summer	Credits
Continuation of research	0

YEAR 4	
Seventh Semester	Credits
Courses/Learning experiences	
CHEM 8XXX - Seminar in the Area of Specialization (Group Meetings)	2
CHEM 8999 – Graduate Research	9
Eight Semester	Credits
Courses/Learning experiences	
CHEM 8896 - Continuation of the Doctoral Thesis	0
Dissertation Defense	0
Fourth Summer	Credits

B. Courses and Learning Experiences (Curricular Design Matrix)

The learning objectives of the program (general objectives) are broken down in the objectives of the courses and other curricular experiences (specific objectives). Fill the column "Learning Objectives" with the overall learning objectives and sort them from the simplest to the most complex according to the Taxonomy of Objectives of Bloom¹¹. Mark the objectives that involve research skills and critical thinking on the columns of the extreme left. Type in the columns of courses the Specific Objectives and / or experiences of your program, from left to right in the order of the curricular sequence. Finally, check the courses and experiences according to how their syllabus meet the general objectives of learning. This will allow you to make a visual analysis of curricular alignment, perceive the order in which the objectives are set out in the curriculum and identify gaps in the design.

Tabla 2.2.B.

Research skills.	Critical Thinking	Learning Objectives (General Objectives)	(Specific Objectives)											
			COURSE CHEM 6011	COURSE CHEM 6225	COURSE CHEM 6411	COURSE CHEM 6611	COURSE CHEM 6811	COURSE CHEM 6012	COURSE CHEM 6215	COURSE CHEM 6412	COURSE CHEM 6612	COURSE CHEM 6812	COURSE CHEM 6905-06 (TA)	COURSE CHEM 8901-02 (Grad Sem.)
<input type="checkbox"/>	<input type="checkbox"/>	1. To demonstrate mastery of the fundamental concepts of chemistry	X	X	X	X	X	X	X	X	X	X	X	X
<input type="checkbox"/>	<input type="checkbox"/>	2. To demonstrate knowledge of the scientific instrumentation as a supporting tools in solving chemical problems.												
<input type="checkbox"/>	x	3. Demonstrate technical capacity to make presentations to a diverse scientific community in Spanish and English.						X		X			X	X
<input type="checkbox"/>	x	4. Demonstrate interpersonal relations skills and teamwork with people from diverse cultural backgrounds.						X						
<input type="checkbox"/>	x	5. Demonstrate ability to keep up their self-taught knowledge through continuous learning.						X		X				
<input type="checkbox"/>	x	6. Handle correctly the scientific literature to support the solution of chemical problems.	X		X			X		X			X	X
x	x	7. Write publishable research documents (articles and a dissertation) in English and Spanish.											X	X
<input type="checkbox"/>	x	8. Integrate the concepts of chemistry to solving theoretical and practical problems that require an interdisciplinary approach.						X		X	X		X	X
<input type="checkbox"/>	x	9. Integrate and effectively convey the fundamental concepts of chemistry using different forms of teaching to various groups.						X					X	X
<input type="checkbox"/>	x	10. Identify and implement occupational safety standards and discipline typical of environmental protection												
<input type="checkbox"/>	x	11. Follow ethical behavior in their academic and professional performance.						X					X	X
x	x	12. Identify a chemical problem, formulate a working hypothesis and discriminate between the possible strategies to address it.						X						

Research skills.	Critical Thinkin	Learning Objectives (General Objectives)	COURSE CHEM 6011	COURSE CHEM 6225	COURSE CHEM 6411	COURSE CHEM 6611	COURSE CHEM 6811	COURSE CHEM 6012	COURSE CHEM 6215	COURSE CHEM 6412	COURSE CHEM 6612	COURSE CHEM 6812	COURSE CHEM 6905-06 (TA)	COURSE CHEM 8901-02 (Grad Sem.)
x	x	13. Design and assemble an experiment, collect and analyze information and identify sources of error, and interpret the results.											X	X

¹¹ The taxonomy of Educational Objectives of Benjamin Bloom, organizes the learning objectives in three domains: cognitive, affective and psychomotor. The cognitive domain is the best known. The same is subdivided into six hierarchical levels of complexity. The initial levels used are: knowledge, understanding and application. Advanced levels require: analysis, synthesis and evaluation. For a brief explanation of the original and the revised taxonomy, see Appendix 3. In this exercise, the revised taxonomy is used.

A. Content and Curricular Revision

1. Does the current curricular contents¹² have a strong credibility, as evidenced by the practice, teaching, study, and is the application of research results and / or theoretical concepts of such content driven by scientific communities of the discipline?

Yes, according to the survey administered to the graduate students of the program, only 11% expressed dissatisfaction with the preparation offered by the program in order to be successful in their careers. Therefore, the external scientific community that evaluates and recruits students for jobs in the industry, government or academia agrees that the curricular content of our program is a solid one and that it prepares our graduates successfully.

2. Was this curricular content peer-reviewed and / or published in places that are not dedicated to promoting the program or individual promoting their professors or researchers?

The curriculum was peer-reviewed in the previous external assessment of the graduate program.

3. Does the content reflects the delineations and ethical, legal and regulatory standards that impact the field of studies in question, including the criteria from accrediting agencies?

Yes, the content partially reflects these delineations and standards, since according to the survey administered to graduates of the program, 48% of the exalumni expressed that the quality of ethics training in the curriculum is satisfactory or very satisfactory.

4. When was the last curriculum review of the program? Month / year.

The latest rcurricular revisión of the program curriculum was in April 2009.

5. ¿De qué forma la última revisión curricular (si alguna) contribuyó a atemperar la oferta curricular a los cambios en la disciplina?

Contribuyó a agilizar que los estudiantes se incorporaran a la investigación más temprano mediante la Propuesta A e iniciarlos en la búsqueda de información en la literatura científica.

How the last curriculum revision (if any) helped temper the curricular offerings to changes from the discipline?

It helped streamline students to join earlier their research topics through the presentation of their Proposition A and introduce them to scientific literatura searches.

6. ¿Ha habido o se prevén cambios o innovaciones significativas en las áreas de estudio del Programa desde la última revisión curricular? Si ha habido, ¿se reflejan de alguna forma estos cambios en el **programa de estudios** (Tabla 2.1.A.) o en la **oferta académica** (Sección II.F) del Programa?

No. Estamos en estos momentos trabajando en una revisión curricular del Programa doctoral y de maestría. La revisión curricular de la maestría a tenor con la Certificación Núm. 38 del Senado Académico, Año Académico 2012-2013, ya fue aprobada por el Programa Graduado de Química y el Departamento.

Have there been or can it be anticipated changes or significant innovations in the areas of study of the Program since the last curriculum review? If there has been, are these changes somehow reflected in the curriculum (Table 2.1.A.) or academic offer (Section II.F) of the Program?

No. We are currently working on a doctoral program curriculum revision and master. The Master's curriculum revision pursuant to Certification No. 38 from the Academic Senate, Academic Year 2012-2013 and was approved by the Graduate Program and the Department of Chemistry.

7. Are there important areas of study that the program would like to address? Can these areas of study be addressed through minor changes to the curriculum, or deserve a full comprehensive curriculum revision? If so, what steps should the program take to renew its curriculum?

Yes, we are currently developing a curriculum revision of the doctoral and master programs.

-
¹² The content refers to knowledge comprising the curriculum.

C. Admission Requirements

Mark with an "X" the requirement of your Program

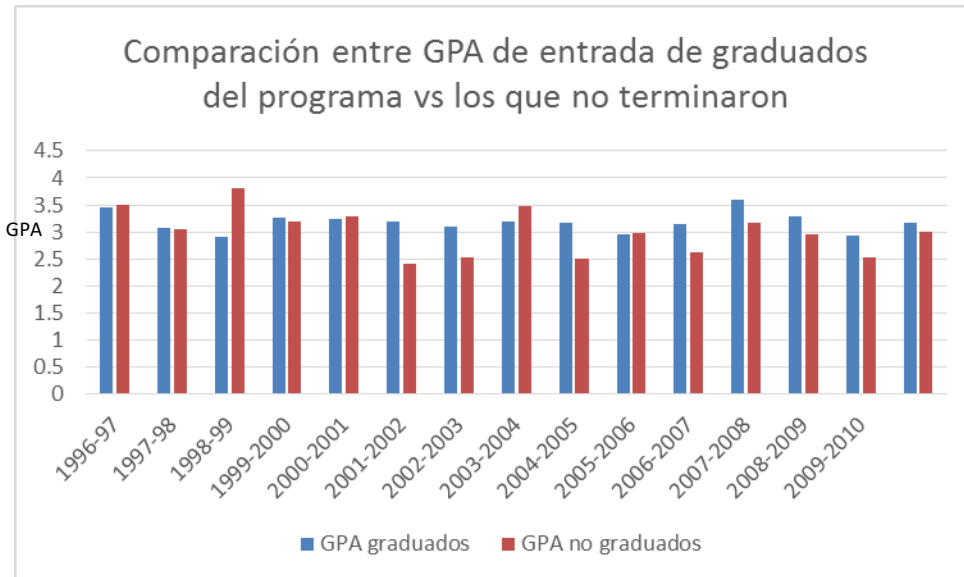
Table 2.3.D.

Admission Requirements	Chemistry Msc/Ph.D
Academic Index (Minimum 3.0 GPA)	<input checked="" type="checkbox"/>
Entrance exam	<input type="checkbox"/>
PAEG	<input type="checkbox"/>
GRE	<input checked="" type="checkbox"/>
Admission Essay	<input checked="" type="checkbox"/>
Interview (optional)	<input checked="" type="checkbox"/>
Recommendations	<input checked="" type="checkbox"/>
Professional Experience	<input type="checkbox"/>
Research Experience (optional)	<input checked="" type="checkbox"/>
Other:	<input type="checkbox"/>

1. ¿Son los **requisitos de admisión** adecuados para identificar a los candidatos idóneos para el programa? ¿Conoce cuál es el valor predictivo de dichos requisitos para pronosticar la retención y el desempeño óptimo de los estudiantes en el programa?

Yes. Admission requirements are adequate to identify suitable candidates for the program, particularly research experience, letters of recommendation and the admissions essay.

However, the correlation between GPA input (courses undergraduate chemistry) and the score on the GRE (chemistry) reflects a slight tendency that the higher the GPA and score on the GRE is more likely that the student will culminate degree . Overall, the average GPA for all years included in this analysis for graduates is 3.2 while the average of those corresponding not completed the degree is 3.0. (See chart below).



¿Cuántos de los admitidos completaron finalmente el programa? Ver tabla aneja.

The table shows that overall 70% or more of those admitted and enrolled in the program successfully complete it. The years where the percentage is less than students admitted in those years who have not yet graduated must. ¿Cuán laxos o exigentes son los requisitos de admisión de su Programa?

Admission requirements of the program are lax. We do conditional admissions if the student has not submitted all the documents required for admission and if they have academic indexes slightly below the required but their other documents show a high probability that the student be successful.

2. ¿Es la preparación de los estudiantes que cumplen con estos requisitos de admisión adecuada para cumplir con el nivel de exigencia del Programa?

The vast majority of the students enrolled are preparing to meet the requirements of the program judging by the data retention and graduation. Few students (less than 10%) fall on probation each year (see table).

Academic year	Enrolled	Graduates	% of graduation	Students in Probation
1996-97	11	7	64	0
1997-98	7	4	57	0
1998-99	15	12	80	1
1999-2000	20	18	90	3
2000-2001	13	12	92	2
2001-2002	14	13	92	0
2002-2003	17	14	82	2
2003-2004	20	17	85	1
2004-2005	16	13	81	0
2005-2006	17	12	70	0
2006-2007	19	7	36	1
2007-2008	12	5	41	2
2008-2009	9	7	77	0

3. ¿Requiere el Programa poseer un bachillerato en la misma disciplina de estudios del Programa para cursar estudios graduados?

No, the student does not need a bachelor degree in Chemistry, but it must have completed the required courses in a course sequence of a Bachelor degree in Chemistry or equivalent.

☒ Sí. ¿Parten los cursos iniciales de la premisa de que se necesita poseer un bachillerato para tomarlos o, por el contrario, redundan en conocimientos que ya se deberían haber adquirido?

☒ No. ¿Se encuentra el currículo sobrecargado de cursos y/o **requisitos de graduación** para compensar la falta de un bachillerato en la disciplina?

4. ¿Existe algún curso (e. g. estadística o curso especializado) que el estudiante deba poseer como **pre-requisito** para poder cursar estudios graduados en su Programa?

☐ Sí. ¿Siguen siendo necesarios estos **pre-requisitos**? ☒ No

D. Graduation Requirements

Mark with an X all the Program Graduation Requirements..

Table 2.4.E.

Graduation Requirements	Chemistry MSc./Ph.D.
Minimum Academic Index	<input checked="" type="checkbox"/>
Total Credit Requirement	<input checked="" type="checkbox"/>
Examn A and B	<input type="checkbox"/>
Proposal Defense	<input checked="" type="checkbox"/>
Research Project	<input checked="" type="checkbox"/>
Thesis/Dissertation	<input checked="" type="checkbox"/>
Practicum	<input type="checkbox"/>
Residency ¹⁴	<input type="checkbox"/>
Internship	<input type="checkbox"/>
Other (Qualifying exams)	<input checked="" type="checkbox"/>

1. ¿Están los **requisitos de graduación** alineados con los **objetivos generales del aprendizaje** del programa? ¿Cumplen los **requisitos de graduación** con su propósito, es decir, facilitan el logro de los **objetivos del aprendizaje** o lo dificultan? (Ver Tabla 2.2.B, Cursos y Experiencias de Aprendizaje)

Yes to both questions, graduation requirements are aligned with general objectives, but the Program is conducting a revision of the program curriculum that could lead to changes in graduation requirements in order to comply with Certification No. 38 of the Academic Senate, Academic Year 2012-2013.

2. ¿Es la selección y organización de los **requisitos de graduación** la más apropiada para facilitar los objetivos del aprendizaje o se podrían cumplir los mismos propósitos por otros medios más eficientes? (Ver Tabla 2.2.B, Cursos y Experiencias de Aprendizaje)

Yes, but we are conducting a revision of the program curriculum that could lead to changes in graduation requirements to comply with the Certification No. 38 of the Academic Senate, Academic Year 2012-2013.

3. ¿Provee el Programa cierta flexibilidad para cumplir con los **requisitos del grado**? Es decir, ¿puede el estudiante escoger entre vertientes de estudio alternas (e.g. investigativa o profesional) o sustituir requisitos por trabajos equivalentes? Explique.

No. The program is designed for students to have an experience attached to a laboratory research program faculty can not provide professional experience or an equivalent job.

4. ¿Se ofrecen opciones para completar los **requisitos del grado** de Doctorado en menor tiempo, pasando por la Maestría? Explique.

N/A, because the program offers the option to go directly to the Doctorate without a completing a Master's.

5. ¿Cuentan todos los **requisitos de grado** con guías, prontuarios o manuales que expliquen los procedimientos, expectativas y criterios de evaluación de los mismos? ¿Gozan estos manuales de la aprobación de los miembros del programa?

Yes, they are included in the Regulations for the program that were approved by the members.

6. ¿Se define en alguna parte un protocolo o itinerario para el desarrollo de las distintas fases del trabajo de tesis/disertación y para los roles del mentor y el estudiante? ¿Gozan estos protocolos de la aprobación de los miembros del programa y de los estudiantes?

Yes, they are included in the Regulations for the program that were approved by the members.

F. Analysis of the Curricular Design

1. Does the program has a full time and part time curricular sequence?

☐ Yes ☒ No, it only has one for full time _____

Does this design responds to the students' needs?

Yes, for the majority.

2. ¿En qué manera el modo en que está diseñada la **secuencia curricular** pudiera afectar el tiempo que le toma al estudiante completar sus requisitos de grado?

In terms of the approval of courses students meet the stipulated time to meet those requirements, while the requirements of graduates and proposed seminars has lengthened the time to meet those requirements. The ongoing curriculum revision should reduce the time it takes for the student to complete their degree requirements.

3. ¿Qué se puede observar en la tabla de Cursos y Experiencias de Aprendizaje acerca de la distribución y la secuencia de los cursos y requisitos? ¿Se puede identificar algún patrón? ¿Se cumplen los **objetivos del aprendizaje** de una forma relativamente ordenada? ¿Se perciben lagunas?

The sequence of courses is distributed with core courses in the first year, which are requirements for specialty courses. The implementation of the next development plan will help students to plan ahead their curriculum with at least two years in advance.

4. ¿Es la distribución del **contenido**¹⁵ del currículo apropiada? Es decir, ¿incluyen los cursos medulares todos los conocimientos y competencias que son fundamentales? ¿Se incluyen los conocimientos deseables en las electivas dirigidas, los cursos de especialidad u otro requisito equivalente? ¿Contienen las electivas libres conocimiento únicamente tangencial?

The core courses do not include all the knowledge and skills that are fundamental, but the main ones. It is understood that students enter with substantial fundamental knowledge. Specialty courses contain a heterogeneous distribution of essential knowledge of the discipline. This hinders integration in the distribution of content, which will be one focus of the next Development Plan.

5. ¿Poseen los cursos medulares un nivel de complejidad adecuado al grado para el cual se ofrecen (Maestría o Doctorado)?

The core courses are the same for students of Master's and Doctoral and have the appropriate level of complexity. This because graduate students as PhD must have basic knowledge of the main discipline.

6. ¿Es la relación entre los **requisitos de admisión** y los **requisitos de grado** adecuada para propiciar un desempeño satisfactorio y eficiente de los estudiantes en el programa? ¿En qué manera la relación entre ambos requisitos facilita o dificulta la obtención del grado?

¹⁵ The content refers to the knowledge contained in the curriculum.

The vast majority of the students enrolled are preparing to meet the requirements of the program judging by the data retention and graduation. This implies an appropriate relationship between admission requirements and grade conducive satisfactory performance in the program, facilitating obtaining the degree.

7. ¿Qué relación existe (si alguna) entre la investigación generada en el Programa y el diseño curricular? ¿Es el diseño curricular lo que orienta las líneas de investigación, o viceversa?

There is no direct relationship between research in the program and curriculum design in the core and advanced courses, but courses on special topics arising from the research interests of professors.

8. ¿En qué forma promueven el currículo y las experiencias co-curriculares el conocimiento y el aprendizaje interdisciplinario?

Emerging research topics presented in the courses encourage students to consider interdisciplinary scenarios. Graduates seminars provide exposure to issues and interdisciplinary knowledge that students subsequently applied in their investigation.

There are internship opportunities in external research centers that provide expertise and co-curricular interdisciplinary learning students. Existing collaborations between local and external researchers promote a interdisciplinary learning.

The program promotes participation in scientific conferences to expose and develop in students the knowledge and interdisciplinary learning.

The next development plan and curriculum review seeks to cross boundaries of disciplines in all areas of science.

9. ¿Atiende el currículo y/o las experiencias co-curriculares las destrezas de información y conocimiento de la tecnología (búsqueda, manejo de información, selección, síntesis) que le permitan al estudiante ampliar su visión del campo?

The curriculum and attend boarding information skills and knowledge of the latest technology in the discipline. The Biblioteca of the Faculty of Natural Sciences offers information skills workshops that promote the development of skills in search and information management. Graduates seminars allow students to select and synthesize the information gathered.

10. ¿Cómo el currículo prepara al estudiante para desarrollar una conciencia social y cívica?

Students take a workshop on ethics in guidance and training activity taking all new students before starting their first semester in the program. The workshops safety and waste management also provide students to develop social and civic awareness.

Many of the research projects in the program attend social problems today.

11. ¿De qué forma el currículo provee para que el estudiante desarrolle destrezas profesionales en los escenarios de trabajo accesibles al futuro egresado del Programa? ¿Provee el currículo para una experiencia de internado o práctica profesional?

No, but the program provides for students can participate in internship experiences in laboratories of academic and industrial research in Puerto Rico and abroad.

12. ¿En qué manera el currículo provee los medios para que el estudiante adquiera las destrezas y actitudes que le permitan ser un profesional productivo y creativo que aporte al desarrollo de su disciplina de estudio?

One of the requirements of the curriculum is for students to present their findings at conferences and published in refereed journals contributing to the development of their

discipline. The requirement of Proposition B stimulates creativity in the development of a distinct solution to your thesis research project problem.

13. ¿Prepara el programa adecuadamente a los estudiantes para pasar los exámenes de certificación? (Si aplica)

N/A

G. Academic Offer

List the courses offered in the academic years shown in the following table. In the classification column mark with an (X) as appropriate.

Table 2.5.F.

Academic Year	Title of Offered Course	Classification (Mark one)		% of drops in core courses	Quantity of Sections	Course Schedule (Mark one)		
		Required	Electives			Morning	Afternoon	Night
2009-2010	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		9%	1	x		
2010-2011	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		0%	1	X		
2011-2012	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		2%	1	X		
2012-2013	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		3%	1	X		
2013-2014	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		8%	1	X		
2014-2015	Q-6011, Q-6012, Q-6225, Q-6215, Q-6411, Q-6412, Q-6611, Q-6612, Q-6812	x		1%	1	x		

1. ¿Con qué regularidad se ofrecen todos los cursos del **programa de estudios**?

At the 6000 level, courses are offered annually. At the 8000 level, the majority are offered in alternate years.

2. ¿Es adecuada la frecuencia con que se ofrecen los **cursos requisitos y electivas dirigidas** de acuerdo con la **secuencia curricular**, las necesidades y la cantidad de los estudiantes?

The survey administered to alumni of the Graduate Program in Chemistry (see annex) shows that 14.29% of respondents believe that the frequency at which the courses offered is very satisfactoria, 35.71% think it is satisfactoria, the 21.43% replied neutrally, 25% answered that the frequency of courses ofrecimineto is poor and 3.57% answered that it is very poor. These statistics reflect 50% of the graduates expressed satisfaction with the frequency with which courses are offered, 21% of graduates were expressed in a neutral and 29% of graduates are dissatisfied with how often they offered the courses.

3. Indique la cantidad de cursos creados, modificados, eliminados, y en moratoria por año académico en la siguiente tabla:

Tabla 2.6.F.

Academic Year	Created	Modified	Eliminated	In Moratorium
2009-10	0	0	0	0
2010-11	0	0	0	0
2011-12	0	0	0	0
2012-13	0	0	0	0
2013-14	0	0	0	0
2014-15	0	0	0	0

4. ¿Cuál es la demanda de cursos de este Programa por estudiantes de otros Programas en el Recinto?

The demand for courses by students of the Department of Physics is high, but not in the Department of Environmental Sciences and the School of Education.

5. ¿Con cuánta regularidad el Programa evalúa los cursos que ofrece?

- ☐ Semestralmente
- ☐ Anualmente
- ☐ En Revisiones Curriculares
- ☒ Have not been done up to this moment

6. ¿Qué opinan los estudiantes sobre el contenido y calidad de los cursos, los procesos de enseñanza aprendizaje y la ejecutoria de los profesores en el salón de clases?¹⁶

The analysis of this question involves a separation between the content and quality of core courses and electives targeted those offered regularly in the program.

The survey administered to the alumni of the Graduate Program in Chemistry (see annex) shows that 28.57% answered that the content and quality of the core courses are very satisfactory, the 46.43% replied that they are satisfactory, the 7.14% answered so neutral, 14.29% answered that the depth and quality of core courses are deficient and 3.57% answered that the content and quality of core courses are very poor. These statistics reflect that 75% of graduates are satisfied with the content and quality of core courses.

Using the same survey as a reference to assess the content and quality of targeted electives, the 17.86% of survey respondents replied that the content and quality of directed electives are very satisfactory, 57.14% answered that they are satisfactorios, the 17.86 % they answered neutrally, the 7.14% answered that the content and quality of electives targeted are poor and 0% replied that the content and quality of directed electives are very poor. These statistics reflect that 75% of graduates are satisfied with the content and quality of core courses.

¹⁶ Utilice la información que se desprende de las evaluaciones de cursos.

III. Professors/Researchers

A. Profile of Professors in the Program

In the following table list the names of professors and their academic background (including the institution and year of graduation for the highest degree obtained). Indicate with an (X) in the corresponding column, if the teacher is a collaborator or ascribed to the program. Also provide the professors field of specialty, years of service, the courses offered regularly and the number of master's and doctorate's theses supervised in the last (5) years. In the last column mark (X) those professors from abroad.

Table 3.1.A.

Name of the Professor	Academic Preparation ¹⁷	Status		Specialty	Research areas	Years of service	Courses regularly offered	Quantity of supervised de Theses	Internationa
		Collaborator	Adscrito						
Carlos Cabrera	Ph.D. Cornell University, 1987			Nanotechnology	Nanomaterials for alkaline fuel cells. Dye sensitized solar cells. Microbial Fuel Cells. Nanobiosensors.	26	Q-5995	8	
Néstor M. Carballeira	Dr. rer. nat. University of Würzburg, 1983			Química Medicinal	Lipid Chemistry and Marine Natural Products: Isolation and Synthesis of New Fatty Acids of Marine Origin; New Antiplasmodial and Antifungal Lipids.	30	Q-5995	4	
Zhongfang Chen	Ph.D. Nankai University, 2000			Thermodynamics Molecular Structure and Chemical Bonding	Computational chemistry, computational nanomaterials science, physical organic chemistry.	7	Q-4041, Q-8996	0	x
Jorge Colón	Ph.D. Texas A&M University, 1989			Química Inorgánica	Inorganic, bioinorganic, and materials chemistry; Layered inorganic compounds; Artificial photosynthesis; Amperometric biosensors; Drug delivery systems; Photophysics and photochemistry of luminescent metal	23	Q-4000	2	
Kai Hans Griebenow	Ph.D. MIT, 1996 University of Duesseldorf, 1992			Bioquímica Avanzada	Structure-guided protein encapsulation, non-aqueous enzymology, protein formulation, protein stability, protein glycosylation, relationship between protein structural dynamics and enzyme activity, PEG modification of proteins, bio-fuel cells.	19	Q-6811	6	x
Ana R. Guadalupe Quiñones	Ph.D. University of North Carolina at Chapel Hill, 1998			Analytical Chemistry	Analytical Chemistry-Electrochemistry: Chemical Sensors and Biosensors; Uses of Immobilized Enzymes; Polymer.	26	Q-8992	3	
Ingrid Montes	Ph.D. UPR-RP, 1985			Química Orgánica	Organometallic chemistry Chemical education	28	Q-3451, Q-3452, Q-3453,	2	
Edwin Quiñones	Ph.D. University of Puerto Rico, 1986			Physical Chemistry	Kinetic studies of enzymes engaged in DNA metabolism at the single-molecule level, protein folding, DNA mechanical properties, fluorescence spectroscopy and laser spectroscopy of small molecules.	25	Q-6612	1	
Abimael D. Rodríguez	Ph.D. The Johns Hopkins University, 1983			Spectrometric Identification of Organics Compounds	Organic Chemistry: Isolation, Structure, Elucidation and Synthesis of Marine Natural Products.	28	Q-4025	4	

John A. Soderquist	Ph.D. University of Colorado, 1977			Organometallic Chemistry	Organic Organometallic Chemistry: Organometallic Reagents in Organic Synthesis and Natural Product Chemistry; Stereochemically Defined Functional Derivatives of Main Group Organometallics; Silicon-Containing Analogues of Natural Products; Metal-Metal Interactions of Organometallics	32	Q-8994	4	
Brad Weiner	Ph.D. University of California, 1986			Physical Chemistry	Physical Chemistry: Gas Phase Molecular Reaction Dynamics; Laser Photochemistry and Photophysics; Gas Phase Kinetics of Reactive Intermediates; Non-Linear Photoprocesses; Molecular Energy Transfer;	27	Q-3001	2	
Dalice M. Piñero	Ph.D. UPR-RP, 2009			Coordination Chemistry	Synthesis of metal complexes and multidimensional networks for their application in Materials Science and Nanomedicine.	1	Q-8005, Q-8901, Q-8990, Q-6012, Q-6905, Q-6906	0	
Liz M. Díaz Vázquez	Ph.D. UPRRP, 2005			Chemical Education, Renewable energy & Sustainability	Chemical Education, Renewable energy & Sustainability	10	Q-6905, Q-6906	0	
Eduardo Nicolau	Ph.D. UPR-RP, 2012			Analytical applications of bio-nanomaterials	Preparation of interfaced bionanomaterials for reactive water purification membranes; Development of point-of-use sensors for the detection of emerging contaminants in water; Synthesis and characterization of nanomaterials for electrooxidation of high-density fuels; Development of analytical methodology through	1	Q-8206, Q-6225, Q-8205	0	
Vilmali López	Ph.D. University of Michigan-Ann Arbor. 2011.			Analytical Chemistry	To design heteronucleation platforms for three major crystallization efforts: to gain understanding of the fundamental factors that affect nucleation in molecular compounds, to promote or inhibit heterogeneous nucleation in chiral and achiral compounds, and to access, stabilize and deliver pure thermodynamically unstable solid-forms and/or pure enantiomers of pharmaceuticals, energetic materials, and electronic materials for novel applications. <i>Main Techniques and Instrumentation</i> , Powder and Single Crystal X-ray Diffraction, Raman, Infrared, and UV-Vis Spectroscopy, Quartz Crystal Microbalance (QCM-D), Microscopy, High	1	Q-8205, Q-8206	0	
José A. Prieto	Ph.D. UPR-RP1982			Organic Chemistry	Organic Chemistry: organic synthesis, synthesis of biologically active compounds, Epoxide chemistry and organometallic synthesis.	31	Q-8406, Q-8405	4	
Pasquale Fulvio	Ph.D. Kent State University, 2009			Organic Chemistry	Self-assembly of building blocks into hierarchical porous frameworks, and biomimetic membranes. Nanomaterials with biocompatible surface groups. Energy storage, conversion, separations, and heterogeneous catalysis. Main techniques. Gas physisorption, TPD, thermal analysis, X-ray and neutron scattering, S/TEM, FTIR, Raman, NMR, cyclic voltammetry, impedance	1	Q-8605, Q-6611, Q-8606,		x
José A. Rivera	Ph.D. Massachusetts Institute of Technology, 2000			Organic Chemistry	Supramolecular chemistry, molecular recognition, organic synthesis, nanotechnology, bioorganic chemistry, medicinal chemistry.	13	Q-6411-6412		
Arthur D. Tinoco	Ph.D. Yale University, 2007			Inorganic and Bioinorganic Chemistry	Bioinorganic Chemistry, Proteomics, Anticancer research, Metal-based	3	Q-6011-6012		
Osvaldo Rosario	Ph.D. UPR-RP, 1978			Analytical Chemistry	Development of Sampling and Analytical Methodology for Organic Pollutants.	35	Q-6225		

¹⁷ Include the institution and graduate year for the highest degree obtained.

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I- Instructor
CX- Assistant Professor
HS- Hours per Week
HC- Credit Hours

Complete the following table using the form Breakdown of

Academic Work of the past academic year:

Table 3.2.B. Desglose de Tarea Académica¹⁸
1st Semester[illegible]

2nd Semester

Professor	Rank	Regular Load								Other Labor				
		Teaching		Research/ Thesis supervision		Administration (Nombramientos)		Advising		Courses	Adhonorem Load	Licenses	Otras	Total HS in "Other Labor"
		HC	ETC	HC	ETC	HC	ETC	HC	ETC	HS	HS	HS	HS	
CABRERA, C.	C	2	0.17	4	0.332	6	0.50							
CARBALLEIRA, N.	C					12	1.0				2			2
CHEN, Z.	C	5	0.42	7	0.58									
COLÓN, J.	C	8	0.67	4	0.33									
DÍAZ, L.	CA	9	0.60	3	0.20	3	0.20							
FULVIO, P.	CX	4	0.33	8	0.67									
GRIEBENOW, K.	C	5	0.42	7	0.58									
GUADALUPE, A.	C	5	0.42	7	0.58									
LÓPEZ, V.	CX	3	0.25	9	0.75									
MORALES, R.	C	3	0.25	3	0.25	6	0.50							
NICOLAU, E.	CX	5	0.42	7	0.58					6				6
PIÑERO, D.	CX	8	0.67	4	0.33									
PRIETO, J. A.	C	5	0.42	4	0.33	3	0.25							
QUIÑONES, E.	C	5	0.42	4	0.33	3	0.25							
RIVERA, J.	C	8	0.67	4	0.33									
RODRÍGUEZ, A.	C	5	0.42	7	0.58									
Professor	Rango	Carga Regular								Otras Labores				
		Enseñanza		Investigación/ Dirección de Tesis		Administración (Nombramientos)		Consejería		Cursos	Tarea Adhonorem	Licencias	Otras	Total HS de "Otras Labores"
		HC	ETC	HC	ETC	HC	ETC	HC	ETC	HS	HS	HS	HS	
ROSARIO, O.	C	6	0.50	6	0.50									
SODERQUIST, J.	C	5	0.42	7	0.58									
TINOCO, A.	CX	9	0.75	3	0.25									
WEINER, B.	C	5	0.42	7	0.58									

¹⁸ Se establecerá la cantidad de horas semanales (HS) y la equivalencia en tarea completa (ETC) para las tres categorías principales, enseñanza, investigación y administración. La equivalencia de tarea completa (ETC) se calcula dividiendo la cantidad de horas-crédito dedicadas a una labor, por las 12 horas-crédito semanales que comprenden la tarea completa (E.g. Seis créditos dedicados a la enseñanza equivalen a 6/12, o 50% de la tarea completa). Bajo la categoría "Otras labores adicionales" se calcularán únicamente las horas semanales dedicadas a esas labores; éstas se sumarán en la columna del total (Total HS de "Otros").

1. ¿Cómo responde el Perfil de los Profesores a las necesidades y aspiraciones del Programa en términos de especialización, internacionalización y desarrollo de la labor investigativa?

See attached analysis.

2. De acuerdo con las categorías de la Tabla 3.2.B., describa la distribución de la carga académica regular ¿Cuál es el promedio de horas semanales dedicadas a cada labor?

See attached analysis.

3. ¿Es adecuada la distribución de la carga académica de los profesores del Programa para promover su productividad y su desempeño en la enseñanza y la investigación?

See attached analysis.

Analysis of (A) Profile of Professors in the Program and (B) Academic Load.

The Graduate Program has professors in all the classical areas of chemistry distributed as follows: 4 in the area of Organic Chemistry, 1 in Biochemistry, 5 Analytical Chemistry, 3 in Inorganic Chemistry 5 in Physical Chemistry and 2 Chemistry education (majoring in Organic Chemistry and Analytical Chemistry) for a total of 20 professors. It also has adjunct professors offering courses and supervise graduate students of chemistry and are attached to the Department of Biology (1), Department of Environmental Sciences (1) Physical Sciences Department (1) and the Department of Biochemistry Campus of Sciences medical (1). All hold doctoral degrees and have postdoctoral experiences or sabbaticals, except the professors of the area of Chemical Education. These experiences have helped them expand and grow professionally in their areas of specialization and research. This group of professors is distinguished by its diversity in terms of the place of obtaining his doctoral degree, nationality and research areas. In terms of the place of obtaining the doctoral degree, 11 obtained their degree in universities in the United States of America of intensive classification in research (Research 1), 2 of German universities, one from China and 6 of our Graduate Program. 25% of professors are women. Within the classical areas of chemistry the teacher presents a wide range of branches ranging from the development of nanomaterials for use in sustainable energy systems as fatty solar cells and fuel cells, nanomaterials in biology, isolation and synthesis of acid source marine with biological activity, computational chemistry of nanomaterials, bioinorganic, biosensors, development of inorganic nanomaterials multilayers used for chemical and biological sensors, drug transport, biochemistry and biophysics of proteins, enzymology in non-aqueous phase, polymers, electrochemistry, the effect of different styles of learning about teaching processes, kinetics of enzymes involved in DNA metabolism, laser spectroscopy of small molecules, isolation, structure elucidation and synthesis of bioactive marine natural products, organometallic chemistry, reaction dynamics of molecules in gas phase photochemical and photophysical nonlinear processes, synthesis of metal complexes and multi-dimensional materials, renewable energy, bionanomaterials for water purification, sensors for detecting contaminants, design platforms for heteronucleación in the crystallization surfaces, development methodology for the synthesis of compounds with biological activity, self-assembly of porous scaffolds, biomimetic membranes, development of strategies for the design of new drugs used in therapies with small molecules that resemble proteins, supramolecular chemistry, to the development of nanostructures formed through self-assembly for biomedical use. This diversity in specialization, internationalization and research areas provide students an experience, a picture and a broad vision and accurate research developments and past and future chemistry. They also contribute to enable the student to the exercise of Chemistry in Puerto Rico and other countries. Provided, also, promoting research and exchange of scientific knowledge with local and international, in full accordance with the mission and vision of the program peers.

Comparing the distribution and the total number of professors at the Graduate Program with other graduate programs in the United States of America the following is observed. Comparing with the University of New Mexico State, which ranks 131 according to the classification of US News and World Report 2014, it employs staff of professors with 17 distributed as follows: 4 in the area of organic 5 in biochemistry, analytical 4, 2 in inorganic and 2 in physical chemistry. They also have a support staff of 8 people responsible for secretarial, administrative and care chemicals

warehouse tasks. In this classification the Chemistry Graduate Program UPR-RP occupies the position 138. On the other hand, if we are to transform the graduate program into a more competitive and be among the top 50 programs we could compare with the program which occupies the 49th position, the Florida State University which has a staff of about 36 professors and a support staff of 35. the 36 professors of this program are distributed according to their specialization area 8 in Organic Chemistry, Biochemistry 9 7 in Analytical Chemistry, Inorganic Chemistry 7 and 5 in Physical Chemistry.

An examination of the teaching staff of our program highlights the immediate need to increase the number of professors in the areas of Biochemistry, Organic and Analytical. The highest priority is in the area of Biochemistry which has resulted in a decrease in academic offer advanced courses in this area which in turn expands the student's graduation time and research opportunities for students. The average years of service of professors of the program is 18, indicating a high proportion (50%) of professors with enough years of service (25 or more) to qualify for retirement within the next 5 years. This situation must be addressed in the Development Plan with a plan active and aggressive recruitment to maintain diversity and competitiveness in research topics, offering curricular and research opportunities for students. In addition, this should result in a more homogeneous distribution with respect to years of service and experience of professors Program.

A majority of professors are assigned an academic load of a graduate school course or 3 credit hours and 2 hours credits Research Seminar (see Table 2.1.B). This charge allows the teacher to develop their research, improve performance and productivity in this and effectively monitor teaching and their students in their thesis projects. This productivity is reflected in the number of publications and annual presentations (Table 3.3.c).

C. Proyectos de Investigación y Labor Creativa

Enumere los proyectos de investigación y labor creativa realizados en el Programa en los pasados seis años (Añada renglones según sea necesario). Si el Programa posee un Centro de Investigación, marque con un asterisco en la columna de “Título del Proyecto” aquellos proyectos que pertenezcan al Centro de Investigación. Coloque una (P) al final del título del proyecto para aquellos proyectos que estén planificados.

Tabla 3.3.C. Ver tabla adjunta

Año	Título del Proyecto (Marque con * los proyectos que pertenezcan al Centro de Investigación)	Personal por Proyecto Profesores Investigadores Asistentes Graduados Asistentes Sub-grad	Tipo de Proyecto Marque con una (X)		Fondos Externos (Indique agencia patrocinadora y la cantidad asignada)	Fondos Institucionales (Indique el fondo y la cantidad asignada)	Publicación de la investigación o labor creativa Marque con una (X)	
			Investi-gativo	Labor Creativa			Arbitrada	No Arbitrada
2009-10			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
2010-11			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
2011-12			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
2012-13			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
2013-14			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
2014-15			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input type="checkbox"/>

PROJECT DIRECTOR	DEPARTMENT	TITLE	GRANTING AGENCY	FUNDS APPROVED/ TOTAL	PROJECT DATE
2009-10					
Arce, Josefina	Chemistry	Puerto Rico Master Math Teacher Program	National Science Foundation	1,500,000.00	Jul 1, 2009 to June 30, 2014
Cabrera, Carlos	Chemistry	Development of a Hydrogen, Chlorine and Methane Sensor Using single wall carbon Nanotubes decorated with metallic Nanoparticles (Student: Enid Contes-de Jesús)	National Aeronautics and Space Administration	30,000.00	Sept 10, 2009 to May 28, 2010
Cabrera, Carlos	Chemistry	Subaward increased - University of Massachusetts	National Science Foundation	370,000.00	Apr 1, 2009 to Mar 31, 2010
Cabrera, Carlos	Chemistry	Center for Advanced Nanoscale Materials II	National Aeronautics and Space Administration	5,000,000.00	Aug 13, 2009 to Aug 12, 2014
Chen, Zhongfang	Chemistry	Development of a Proto-Type Model to Predict Cellar Penetration of Nanomaterials	Arizona state University Research Subaward Agreement	60,000.00	Aug 1, 2009 to June 30, 2011
Griebenow, Kai	Chemistry	Chemical Protein Glycosylation	National Institutes of Health	1,305,720.00	Jan 1, 2009 to Dec 31, 2012
Morales, Reginald	Chemistry	Support for University Biomedical Excellence at UPR-RP* (R25)	National Institutes of Health	6,392,284.00	August 01, 2009 to June 30, 2014
Schreiter, Eric R. (Resigned June 20, 2011)	Chemistry	Structural Contexts and Functional Consequences of Protein S-nitrosylation	National Institutes of Health	1,522,850.00	June 1, 2009 to May 31, 2011
Soderquist, John	Chemistry	New Asymmetric Organoborane Conversions via 9-Borabicyclo (3.3.2) Decanes*	National Science Foundation	372,400.00	Oct 1, 2009 to March 19, 2010

Zavala-Ruiz, Zarixia (Resigned June 20, 2011)	Chemistry	Biochemical Characterization of the Regulatory T.-cell Protein LAG-3	National Institutes of Health	337,500.00	Aug 1, 2009 to July 31, 2012
2010-11					
Chen, Zhongfang	Chemistry	Computational Quest for Nanocatalysts with Novel Zeolitic Carbon Support for Bioethanol Production	UT Battelle LLC for the Dept of Energy Oak Ridge National Lab. Tennessee (Subcontract)	25,000.00	June 01, 2010 to Sept 30, 2011
Morales, Reginald	Chemistry	Support for University Biomedical Excellence at UPR-RP (Supplement)	National Institutes of Health	64,990.00	August 01, 2010 to June 30, 2014
Morales, Reginald	Chemistry	Río Piedras MARC U-STAR Development Program (2T34GM007821-35)	National Institutes of Health	6,392,831.00	Jun 01, 2010 to May 31, 2015
Prieto, José A.	Chemistry	Synthesis of Polypropionate Antibiotics Via Epoxide Chemistry* (SC1)	National Institutes of Health	1,326,300.00	March 01, 2010 to Feb 28, 2015
Rivera, José E.	Chemistry	Small Molecule Self-Assembly in Aqueous Media (SC1)	National Institutes of Health	1,319,832.00	Jul 26, 2010 to June 30, 2015
Rodríguez, Abimael	Chemistry	New Leads Against Cancer and Infectious Diseases from Puerto Rican Reef Species* (SC1)	National Institutes of Health	1,203,357.00	March 01, 2010 to Feb 28, 2015
Schreiter, Eric Zarixia Zavala (Resigned June 20, 2011)	Chemistry	MRI-R2: Acquisition of High-throughput crystallization Instrumentation of Enhance the Macromolecular X-ray Crystallography Facility of the UPR	National Science Foundation (ARRA)	516,658.00	Jan 01 2010 to Dec 31, 2012
2011-12					
Colón, Jorge	Chemistry	Subaward California Institute of Technology	National Science Foundation	25,000.00	March 1, 2012 to Jul 31, 2012

Griebenow, Kai	Chemistry	UPR-UGA Partnership for a Research Center for Excellence in Renewable Energy	US Department of the Army	3,979,988.00	Jun 1, 2011 to May 31, 2015
Severino, Carlos E. Weiner, Brad R. Cuevas, Elvira Borrero, Michelle Ríos, Rafael	Chancellor Chemistry Biology Biology Environmental Sciences	Maximizing Yield Through Integration (MYTI: Science and Math Education in the Context of a Disposing Society*	National Science Foundation	1,250,000.00	Sep 15, 2011 to August 31, 2016
2012-13					
Cabrera, CarlosJia, Yi	Chemistry	Label-Free Electrochemical Capacitance DNA Sensing with Passive Wireless Radio Frequency Identification TechnologyAmendment No. 001	National Science Foundation	372,000.00	Aug 15, 2012 to Jul 31, 2015
Chen, Zhongfang	Chemistry	Theory-guided Innovation of Noncarbon Two-dimensional Nanomaterials	Department of the Army	420,000.00	Feb 15, 2012 to 14 Feb, 2015
Colón, Jorge	Chemistry	Subaward California Institute of Technology	National Science Foundation	40,000.00	Aug 1, 2012 to Jul 31, 2013
Díaz-Vázquez, Liz	Chemistry	Farbrication of nanostructured polymeric materials for environmental remediation and sensing of military explosives	Homeland Security	50,000.00	Jan 1, 2012 to Dec 31, 2013
2013-14					
Colón, Jorge	Chemistry	Subaward California Institute of Technology	National Science Foundation	40,000.00	Aug 1, 2013 to Jul 31, 2014
Tinoco, Arthur D.	Chemistry	Equipment	Puerto Rico Science Technology and Research Trust	300,000.00	Feb 28 2013 to Sept 30, 2014
2014-15					

Colón, Jorge	Chemistry	Subaward California Institute of Technology	National Science Foundation	40,000.00	Oct 1, 2014 to Sep 30, 2015
Morales, Reginald	Chemistry	Support for University Biomedical Excellence at UPR-RP Research Initiative for Scientific Enhancement (RiSE)	National Institutes of Health	7,024,330.00	July 1, 2014 to June 30, 2019
Nicolau, Eduardo Cabrera, Carlos	ChemistryChemistry	Acuerdo de colaboración con el Centro de Recursos para Ciencias e Ingeniería en la propuesta "Enabling Technologies for Water Reclamation in Future Long-Term Space Missions: Wastewater Resource Recovery for Energy Generation", administrada por el Dr. Gerardo Morell	NASA-EPSCoR	933,645.00	Oct 25, 2014 to Sept 30, 2017
Tinoco, Arthur D.	Chemistry	Development of Peptide-Conjugate Biomimics for Targeted Ti (IV)-Based Anticancer D	National Institutes of Health	1,392,000.00 1,392,000.00	Sep 01, 2014 to Aug 31, 2019
2015					
Cabrera, Carlos	Chemistry	Development of a Biosensor Microchip for the Detection of Microorganisms and Cancer Cells at the Point of Care	Fideicomiso de Ciencia y Tecnología	150,000.00	Jun 1, 2015 to May 30, 2016
Chen, Zhongfang	Chemistry	Theory-guided Innovation of Noncarbon Two-dimensional Nanomaterials (additional Support)	Department of the Army	49,993.00	Oct 15, 2015 to July 14, 2016
Colón, Jorge	Chemistry	Subaward California Institute of Technology	National Science Foundation	60,000.00	Oct. 1, 2015 to Sep 30, 2016

López, Vilimali	Chemistry	Biocompatible-Tailored-Nanocrystal-Drug for Colorectal Cancer Treatment	Univ. of Puerto Rico, Central Adm. Through RCSE-SPESCOR (IFN)	100,000.00	May 4, 2015 to April 30, 2017
Morales, Reginald	Chemistry	Maximizing the Quality of Future Graduate Studies for UPR-Rio Piedras MARC U*Star Trainees (2T34GM007821-36)	National Institutes of Health	4,741,245.00	Jun 1, 2015May 31, 2020
Nicolau, Eduardo (Cruz-Tato, Perla Fellowship)	Chemistry	Fellowship: On the development of catalytic polymeric membranes for water purification and resource recovery from wastewater for life support systems	NASA-ASTAR	165,000.00	Sept 11, 2015 to Aug 31, 2016
Piñero, Dalice	Chemistry	Multimodal Theranostic Nanoprobes for Non-Invasive Bioimaging and photothermal Treatment of Cancer	Univ. of Puerto Rico, Central Adm. Through RCSE-SPESCOR (IFN)	100,000.00	May 5, 2015 to April 30, 2017
	TOTAL			\$ 48,972,923.00	

1. Discuta el grado de correspondencia de las investigaciones realizadas en los pasados cinco años y las líneas de investigación presentadas en la tabla 3.1ª?

Ver análisis adjunto.

2. Si ha habido cambios en los temas de investigación, ¿son éstos el resultado de innovaciones significativas en las áreas de estudio del Programa, cambios en la disciplina, prácticas deseables o desarrollos previsibles?

Ver análisis adjunto.

3. ¿En qué medida las investigaciones del Programa tienen un impacto en la investigación de los estudiantes (dirección de tesis y disertación, supervisión y capacitación)?

Ver análisis adjunto.

4. ¿En qué medida las investigaciones del Centro de Investigación (si aplica) tienen un impacto en la investigación de los estudiantes (dirección de tesis y disertación, supervisión y capacitación)?

Ver análisis adjunto.

5. ¿Qué actividades lleva a cabo el Programa que tengan un impacto directo en la profesión o en la comunidad? (e.g. Participación en juntas editoriales, estudios comisionados)

Ver análisis adjunto.

6. ¿Qué actividades lleva a cabo el Centro de Investigación (si aplica) que tengan un impacto directo en la profesión o en la comunidad? (e.g. Participación en juntas editoriales, estudios comisionados)

Ver análisis adjunto.

7. ¿Colabora la facultad actualmente en proyectos con pares en el Recinto, en otras instituciones en y fuera de PR?

☒ Sí (Mencione cuáles) ☐ No

Ver análisis adjunto.

C. Análisis: Proyectos de Investigación y Labor Creativa.

Existe un alto grado de concordancia entre los intereses de investigación de cada profesor durante los pasados años y su área de especialización. No obstante, los profesores se mantienen atentos a los nuevos desarrollos en la investigación dentro de sus campos y adaptan sus intereses a los nuevos cambios, tendencias y oportunidades de fondos externos para de esta manera mantener una alta competitividad en su campo.

A parte de generar nuevo conocimiento en el área de investigación, las investigaciones impactan directamente a los estudiantes graduados del Programa. Desde que el estudiante ingresa al Programa se le estimula iniciar su investigación mediante su incorporación a un grupo de investigación bajo la supervisión de un mentor. Éste le presenta al estudiante un tema de investigación formulándole un problema para que el estudiante lo desarrolle como su proyecto de tesis. Durante este proceso el mentor mantiene una relación y supervisión estrecha con el estudiante. El proceso culmina con la redacción de su tesis, presentaciones en foros científicos y la publicación de su trabajo en revistas arbitradas. Todo este proceso le provee al estudiante una sólida preparación académica y de investigación la cual los capacita para competir muy favorablemente con egresados de otras universidades norteamericanas en la búsqueda de empleos en la industria, la academia o en experiencias posdoctorales.

Los profesores del Programa participan activamente como evaluadores críticos (reviewers) de manuscritos de revistas de alto impacto tales como revistas del ACS, Proceeding of the National Academy of Science, Nature Nanotechnology, entre otras, y de propuestas presentadas por colegas de otras universidades en agencias federales como NIH, NSF, NASA, DOE, entre otras y de otras agencias internacionales como Israel Science Foundation. Participan además en puestos directivos de asociaciones profesionales como el ACS, el Colegio de Químicos, AAAS, IUPAC, juntas editoriales de revistas arbitradas (Lipids, Journal of Chemical Education, Chemistry and Physics of Lipids, (IN)Genios) y la Junta Examinadora de Químicos, entre otras. Estas solicitudes que surgen debido a la reconocida pericia en sus campos y participación en actividades propias de la profesión son un excelente indicador y reconocimiento al grado de competitividad y prestigio profesional de los profesores del Programa en sus áreas a un nivel internacional.

La colaboración en proyectos de investigación de los profesores del Programa es multidimensional extendiéndose a fronteras más allá del Departamento (múltiples entre colegas), la Facultad (con profesores de los Departamentos de Biología, Ciencias Ambientales y Biología), el Recinto (la Facultad de Educación) y el Sistema UPR (Recinto de Ciencias Médicas, UPR-Humacao, UPR-

Mayagüez), otras universidades del país (Universidad Interamericana, Universidad del Turabo, Universidad Metropolitana y Universidad Central del Caribe) y con un gran número de universidades y centros de investigación en países tales como Alemania, Brasil, China, España, Estados Unidos de Norteamérica y Francia, entre otras). Estas colaboraciones han resultado en publicaciones y propuestas conjuntas.

D. Fondos

Indique la cantidad de asistentes de investigación y de cátedra asignados al Programa, los fondos para viajes y la cantidad de viajes realizados para la divulgación de investigación.

Tabla 3.4.D. Néstor

Año	Cantidad de asistentes de investigación	Cantidad de asistentes de cátedra	Fondos asignados para viajes	Cantidad de viajes realizados para divulgación de investigación
2009-10	0	-	0	0
2010-11	0	-	0	0
2011-12	0	-	0	0
2012-13	0	61	0	0
2013-14	0	42	\$4,000.00	10-13

1. ¿Qué incentivos provistos por el Programa, la Facultad o el Recinto usan los profesores y estudiantes del Programa para la investigación?

Ver análisis adjunto.

2. ¿Considera que la cantidad y tipo de incentivo que el Programa ofrece a los profesores es suficiente para fomentar la investigación en su Programa?
☐ Sí ☒ No (Por favor explique)

Ver análisis adjunto.

3. ¿Considera que la cantidad de ayudantías de cátedra o investigación es suficiente para satisfacer con las necesidades del Programa? ☐ Sí ☒ No (Por favor explique)

Ver análisis adjunto.

4. ¿Es adecuado el apoyo institucional brindado mediante ayudantías, fondos para viajes, etc. para el desarrollo de la investigación y labor creativa en el Programa?

No. Ver análisis adjunto.

5. ¿Qué gestiones realiza el Programa para allegar más fondos externos para sus investigaciones?

Ver análisis adjunto.

6. ¿Logran los profesores y la gerencia académica del Programa allegar suficientes fondos externos para financiar la investigación?

Ver análisis adjunto.

D. Análisis: Fondos

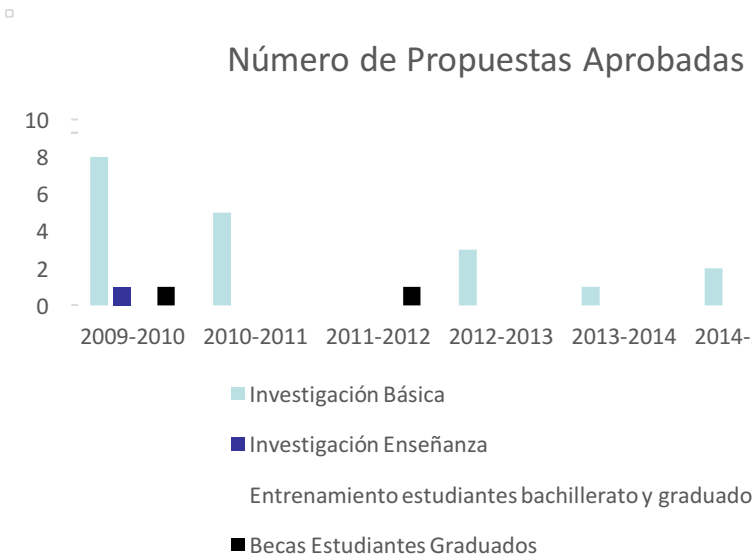
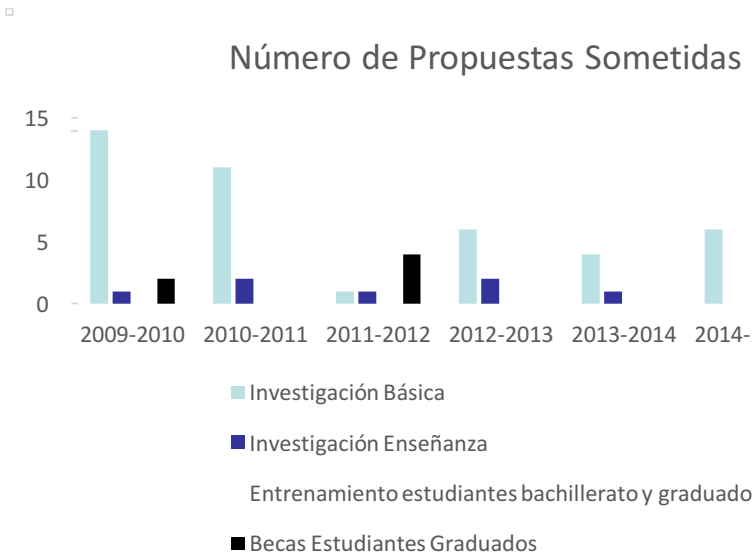
El mejor incentivo que tienen los profesores y estudiantes en sus investigaciones es el compromiso, la dedicación, el deseo genuino de superación y reconocimiento en su campo ya que la cantidad y el tipo de incentivo que provee la Institución no es cónsona con las aspiraciones de tener un Programa de una clasificación alta dentro de los programas graduados de Química a un nivel internacional. Entre los incentivos que provee la Institución y de los cuales participan los profesores y estudiantes identificamos los fondos FIPI, fondos de viaje, fondos semillas y parte del presupuesto departamental (\$10,000-\$15,000 anual) utilizado para la compra de gases, disolventes, nitrógeno líquido, hielo seco, mantenimiento y reparación de equipos, recogido de desperdicios tóxicos, algún equipo de seguridad para los laboratorios y de primordial importancia, la substitución de tareas. Los renglones de fondos de viaje, licencias sabáticas y fondos semillas para el reclutamiento de nuevos profesores (\$150,000) son limitadas y no competitivas al compararlos con los programas graduados cuya clasificación aspiramos alcanzar cuyos fondos semilla oscilan entre \$300,000 a \$750,000 (dato provisto por los Directores de Departamento de New Mexico State University y Florida State University. Además, en Florida State University la oferta inicial en fondos semilla incluye salario de un estudiante postdoctoral por dos años que incluye su plan médico, salario para dos estudiantes graduados por dos años, salario para el profesor por los dos meses de verano, fondos para viajes para participar en dos reuniones anuales por tres años y fondos para instrumentación de acuerdo

a las necesidades del investigador).

Al presente al Departamento se le asignan (32) ayudantías de cátedra o investigación, cantidad que se ha disminuido durante los últimos años. Con el reciente reclutamiento de 4 profesores, el Programa tiene la capacidad para incrementar este número a 40. Es necesario, a su vez ofrecerle a los estudiantes reclutados como ayudantes de cátedra o de investigación un salario que sea más competitivo al actual de \$8,720 a nivel de maestría y \$10,900 (por diez meses) a nivel doctoral para atraer al Programa los mejores estudiantes del país e internacionales. Esto no compara con lo ofrecido por otros programas. Por ejemplo, el salario para estudiantes graduados de química en la Universidad de Nuevo México es \$21,700 por once meses y en Florida State University es \$23,500 por 12 meses.

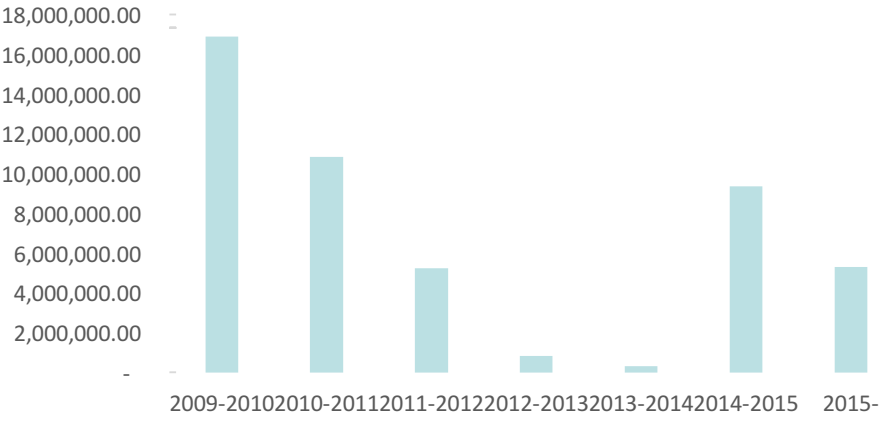
Con el limitado apoyo Institucional es extremadamente difícil financiar una tarea investigativa activa y productiva. Esto obliga y compromete al profesor a gestionar mediante propuestas a agencias federales y locales para allegar más fondos.

Desde el 2009 hasta el 2014-15, se sometieron un total de 59 propuestas (42 en investigación básica, 7 en investigación de enseñanza, 4 para entrenamiento de estudiantes y 6 para becas de estudiantes). En ese mismo periodo se aprobaron un total de 26 propuestas (19 en investigación básica, 1 en enseñanza, 4 para entrenamiento de estudiantes y 2 para becas de estudiantes), lo que refleja un 44% de éxito. En general, se observa una disminución en el número de propuestas presentadas y aprobadas a través de este periodo, no obstante a partir del 2015 se observa un crecimiento significativo el cual se puede adjudicar a la búsqueda de fondos por los profesores recién reclutados.



□

Total de Fondos Provenintes de Propuestas Aprobadas



E. Investigación Estudiantil

Enumere la cantidad de investigaciones realizadas y divulgadas por los estudiantes, incluyendo Tesis y Disertaciones, ya sea en conferencias, congresos, seminarios o en publicaciones (Puede también incluirse como apéndice con la misma información solicitada).

Tabla 5.6.E. (Ver tabla en **Apéndice 1**)

Año	Cantidad de investigaciones realizadas y divulgadas por estudiantes	Títulos de investigaciones	Congresos, conferencias, seminarios en los que se ha divulgado la investigación (nombre y lugar)	Publicaciones (Título de publicación, año y país. En caso de ser revista indique el volumen.)	
				Arbitrada	No Arbit.
2009-10					
2010-11					
2011-12					
2012-13					
2013-14					
2014-15					

1. ¿Qué reflejan los datos de la tabla anterior en cuanto a la investigación estudiantil a lo largo de estos años?

Ver análisis adjunto.

2. ¿Qué iniciativa debe tomar el Programa para aumentar la divulgación de las investigaciones estudiantiles?

Ver análisis adjunto.

3. ¿Qué porcentaje de los estudiantes sub-graduados participan en las investigaciones desarrolladas por el Programa?

20%

E. Investigación Estudiantil

número de publicaciones/por estudiante que publica por año = 1.6 (2014), 1.5 (2015)

número de presentaciones/por estudiante que presenta en congresos por año = 1.9 (2014), 1.7 (2015)

Desde el año 1997 el Programa estableció la norma que como requisito para la obtención del grado doctoral el estudiante debe tener por lo menos una publicación en una revista arbitrada antes de graduarse. El cumplimiento con este requisito ha resultado en un aumento en el número de publicaciones por los estudiantes.

De un total de 480 estudiantes matriculados en el bachillerato en Química, un 20% se matricula en el curso de investigación subgraduada (Q-4999) cada semestre. Un buen número de estos participan en programas de investigación auspiciados por NIH (RISE, MARC), NSF (GK-12, AMP, Bridge to the Doctorate), entre otros. La participación activa de los estudiantes subgraduados en la investigación se demuestra a través de sus presentaciones en reuniones científicas y su presencia como coautores en las publicaciones.

F. Publicaciones

En la siguiente tabla indique las publicaciones desarrolladas por los profesores del Programa en los últimos seis años. Indique el título o la ficha bibliográfica de la misma. En la última columna marque con una (X) aquellas que han sido publicadas en revistas arbitradas (Puede también incluirse como apéndice con la misma información solicitada). Ver **Apéndice 5**.

Tabla 3.7.F.

Año	Nombre del Profesor	Número de Publicaciones	Arbitrada Marque con una (X)
2009-10			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
2010-11	Arce, R.	3	<input type="checkbox"/>

	Chen, Z.	12	<input type="checkbox"/>
	Cabrera, C.	21	<input type="checkbox"/>
	Carballeira, N.	4	<input type="checkbox"/>
	Colón, J.	3	
	Díaz, L.	1	
	Griebenow, K.	4	
	Ishikawa, Y.	10	
	Guadalupe, A.	1	
	Montes, I.	1	
	Prieto, J.	1	
	Quñones, E.	1	
	Raptis, R.	2	
	Rivera, J.	3	
2011-12	Adam, W.	1	<input type="checkbox"/>
	Cabrera, C.	7	<input type="checkbox"/>
	Carballeira, N.	4	<input type="checkbox"/>
	Chen, Z.	21	<input type="checkbox"/>
	Colón, J.	3	
	Griebenow, K.	5	
	Ishikawa, Y.	10	
	Prieto, J.	2	
	Soderquist, J.	1	
	Raptis, R.	4	
	Rivera, J.	2	
2012-13	Rivera, J.	1	<input type="checkbox"/>
	Negrón,	1	<input type="checkbox"/>
	Griebenow, K.	6	
	Piñero, D.	5	
	Chen, Z.	19	
	Carballeira, N.	5	
	Colón, J.	4	
	Rodríguez, A.	2	
	Rivera, J.	1	<input type="checkbox"/>
	Negrón,	1	<input type="checkbox"/>
	Griebenow, K.	6	
	Piñero, D.	5	
	Chen, Z.	19	
	Carballeira, N.	5	
	Colón, J.	4	
	Rodríguez, A.	2	
2013-14			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
2014-15			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

3. ¿Cuál es la expectativa del Programa en cuanto a la cantidad de publicaciones que espera anualmente de cada profesor?

Ver análisis adjunto.

2. ¿Qué porcentaje de publicaciones de los profesores se hacen en revistas arbitradas?
100%

3. ¿Tiene el Programa una publicación propia?

☐ Sí (Conteste preguntas 3.a la 3.e)

☒ No (Pase a la pregunta 6)

3a. Título: _____

3b. Año en que comenzó: _____

3c. Tipo de publicación:

☐ Impresa

☐ Electrónica

☐ Semestral

☐ Anual

☐ Otra: _____

3d. Circulación:

Cantidad de tirada:

Distribución:

☐ Correo federal

☐ Correo Interno

☐ Por canje

☐ Otro: _____

2. ¿Incluye la presente Junta Editora de la publicación del Programa (si aplica) miembros internacionales? ¿Cuál es la proporción de miembros internacionales en relación al total?
3. ¿Posee la publicación suficiente alcance como para dar a conocer la investigación generada a las poblaciones importantes del Programa (estudiantes, investigadores, foros prominentes)?
4. ¿Qué estrategias de divulgación de sus investigaciones utiliza el Programa dentro y fuera del Recinto?

☒ Publicaciones (revistas, libros)

☒ Foros

☒ Congreso

☒ Seminarios a la comunidad universitaria

☒ Seminarios a la comunidad fuera de la universidad

☒ Otros Artículos en periódicos.

5. Según los datos recogidos en esta sección, ¿está la cantidad de publicaciones de los pasados seis años de acuerdo con los objetivos del Programa (de acuerdo a la expectativa de publicaciones anuales que se tenía por profesor)?

Ver análisis adjunto.

6. ¿Cuál ha sido el impacto de las publicaciones en la competitividad y proyección del Programa?

Ver análisis adjunto.

F. Análisis: Publicaciones

Respecto a las publicaciones, el criterio principal en su evaluación como indicador de productividad es la calidad de la misma en lugar de la cantidad. Así pues, la expectativa es que el profesor publique en revistas de alto impacto de 2 a 3 publicaciones al año. En el caso de profesores recientemente reclutados en sus cartas contractuales se establece el número de publicaciones que este debe tener antes de la consideración para permanencia. Todas las publicaciones se hacen en revistas internacionales arbitradas. En los pasados 5 años (Año Académico 2010-2011 a Año Académico 2014-2015) los profesores publicaron un total de 305 artículos para un promedio de 61 publicaciones por año y el promedio del número de publicaciones por año entre los profesores que publican fue igual a 5.3. Este promedio resulta ser mayor que el reportado por la Florida State University de una publicación por año por profesor.

Además de divulgar sus investigaciones por medio de publicaciones en revistas arbitradas, los profesores utilizan otros medios tales como congresos científicos en su área, foros, seminarios a la comunidad universitaria local e internacional. Esta diversidad e intensidad en las actividades de divulgación de las investigaciones han resultado en un incremento en la visibilidad del Programa a un nivel internacional, en atraer nuevos estudiantes, invitaciones a profesores a dictar conferencias en congresos, en otras universidades e institutos de investigación, en el inicio de colaboraciones, en la solicitud a profesores como evaluadores externos de publicaciones y propuestas de otros colegas internacionales, evaluación de programas, en la aprobación de sus propuestas y en la obtención de fondos externos.

IV. Estudiantes/Egresados

A. Admisión

1. Cupo

- a. Indique el cupo del Programa

El programa no tiene un número fijo de cupo numérico establecido. Sin embargo, los siguientes criterios son utilizados para establecer el número de estudiantes que son admitidos cada año.

- b. Marque cuáles de los siguientes criterios se consideran para determinar el cupo del programa:

- ☒ Instalaciones
- ☒ Cantidad de estudiantes activos
- ☒ Presupuesto
- ☒ Cantidad de profesores disponibles para enseñar cursos
- ☒ Cantidad de investigadores activos que podrán supervisar tesis
- ☒ Cantidad de cursos a enseñarse
- ☐ Cantidad de estudiantes en prórroga
- ☒ Ayudantías disponibles
- ☒ Diversidad de la población estudiantil
- ☐ Otros: _____

2. Reclutamiento

- a. ¿Tiene el Programa un plan de reclutamiento para estudiantes?

☒ Sí. ¿Cuán eficaz ha sido el mismo? Indique la cantidad de estudiantes reclutados mediante ese plan en los últimos 5 años

117 (ver Tabla 4.1.A).

☐ No.

¿Cuáles son las estrategias de reclutamiento que utiliza el Programa?

- ☒ Ferias de estudios graduados
- ☒ Campaña publicitaria
- ☒ Visitas a universidades
- ☐ Otras Casa Abierta y visitas a universidades en otros países
- ☐ Ninguna

3. Distribución de la población estudiantil. Escriba en la siguiente tabla las cifras para los pasados seis años.

Tabla 4.1.A.

Año	Solicitantes		Admitidos		% de Selectividad		Admitidos del Sistema UPR		Matriculados		Atractivos	Estatus Matriculados		Total estudiantes en Programa
	Masculino	Femenino	Masculino	Femenino	Masculino	Femenino	Río Piedras	Otras unidades del Sistema	Masculino	Femenino		Tiempo Parcial	Tiempo Completo	
2009-10	18	22	10	17	56	77	18	7	7	12	70%		19	117
2010-11	20	16	12	13	60	81	16	5	5	5	40%		10	119
2011-12	23	14	11	11	48	79	8	2	8	10	82%		18	110
2012-13	24	14	13	14	54	100	12	2	13	12	93%		25	103
2013-14	12	17	8	8	67	47	12	1	7	6	81%		13	96
2014-15	7	19	4	10	57	53	5	3	1	6	50%		7	85

Selectividad = admitidos/solicitantes; atractivo = matriculados/aceptados

- a. Considere los datos provistos en la tabla anterior y evalúe. ¿Cuán selectivo¹⁹ y atractivo²⁰ es el Programa?

El por ciento de selectividad del programa en promedio es 57% para los estudiantes masculinos y un 73% en promedio para las estudiantes femeninas. El por ciento de atracción en promedio es 70%, lo que consideramos satisfactorio.

- b. ¿Cómo ha variado la cantidad de estudiantes en el programa en los pasados seis años?

La cantidad de estudiantes ha mermado durante los pasados tres años. No obstante, en el año 2015-2016 se duplicó el número de estudiantes admitidos y matriculados en el programa.

En los últimos tres años también se observó una merma en el número de solicitantes.

- c. ¿Cómo se han ajustado las admisiones en relación al cupo?

N/A

- d. Describa la distribución de la matrícula en términos de género

Durante 4 de los años incluidos en este autoestudio la distribución fue equitativa entre la matrícula de estudiantes masculinos y femeninos. Sin embargo, en el 1er año y en el último año incluido en el autoestudio, hay un mayor por ciento de féminas.

¹⁹ La selectividad se refiere a la cantidad de estudiantes que se admiten de los solicitantes.

²⁰ El atractivo se refiere a la cantidad de estudiantes aceptados que finalmente se matriculan.

- e. Describa la distribución de estudiantes a tiempo completo y a tiempo parcial

Todos son estudiantes regulares a tiempo completo.

- f. Describa la proporción de estudiantes admitidos de la UPR-Recinto de Río Piedras con la de los admitidos de otros recintos del Sistema UPR

El 50% son estudiantes del Recinto de Río Piedras.

- g. Describa y compare la cantidad de estudiantes por recinto de UPR que son provenientes de otros países (Ver Tabla 2.4.B)

No existe una Tabla 2.4.B

4. Estudiantes Internacionales

Indique en la siguiente tabla la cantidad de estudiantes internacionales que han solicitado admisión al Programa, los que han sido admitidos y matriculados.

Tabla 4.2.A.

Año	Solicitantes internacionales		Admitidos	Matriculados
	Cantidad	Países de Procedencia		
2009-10	6	China, Colombia, India, Irán, República Dominicana	1	0
2010-11	4	África, Colombia	1	0
2011-12	13	China, Dubai, Haití, India	7	5
2012-13	21	China, Colombia, Costa Rica, Cuba, Haití, India, Venezuela	12	7
2013-14	13	China, Colombia, Haití, Honduras	3	2
2014-15	14	China, Colombia, Dubai, India, México	5	2

- a. ¿Cuán diverso, en términos de procedencia específica, es el cuerpo estudiantil del Programa?

Es muy diverso, incluye estudiantes de América Latina, el Caribe, Asia y África.

- b. Describa como la diversidad contribuye a la competitividad, el enriquecimiento del Programa y a la meta de internacionalización del Recinto y la UPR

El aprender de otras culturas se lleva a cabo de forma espontánea cuando se logra la integración de estudiantes con trasfondos culturales distintos, lo cual ha sido uno de los éxitos del programa. Traer estudiantes de otras culturas que tienen unos compromisos, estilos de vida, métodos de estudios y enfoques en la enseñanza distintos a los nuestros aumenta la competitividad del programa ya que los estudiantes aportan en sus cursos tanto en la construcción de ideas y en la formulación y el análisis a preguntas científicas en formas diversas. Como consecuencia, los estudiantes del programa tienen la oportunidad de enriquecer su capacidad de análisis, aumentan

su visión de lo que otros programas en otros países proveen y se familiarizan con la realidad de los problemas sociales que confrontan otras regiones del mundo.

B. Retención Estudiantil

Indique la cantidad de estudiantes por cohorte para cada año académico. Calcule la tasa de retención para el segundo y tercer año, si el programa evaluado es de Maestría, y para el segundo y cuarto año si es del Doctorado. Luego establezca el porcentaje de retención²¹ para dichos años.

Tabla 4.3.B.

Año de admisión	Cantidad de estudiantes matriculados en el 1er año	Cantidad de estudiantes matriculados 2do año		Cantidad de estudiantes matriculados 3er año		Cantidad de estudiantes matriculados 4to año	
		#	%	#	%	#	%
2009-10	19	7	36	6	31	6	31
2010-11	10	5	50	2	20	2	20
2011-12	18	17	94	9	50	8	44
2012-13	25	25	100	16	64	16	64
2013-14	13	7	53	7	53	N/A	
2014-15	7	7	100	N/A		N/A	

²¹Cantidad de estudiantes que se matriculan cada año dividido entre la cantidad de estudiantes que se matricularon en el primer año de estudio.

5. Marque con una (X) las razones principales que por las que los estudiantes no completaron su Programa. Utilice información que haya sido recopilada por el propio Programa a través de cuestionarios u otros medios.

- ☐ Incapacidad física
- ☐ Servicios en Fuerzas Armadas
- ☒ Ausencia prolongada
- ☒ Suspensión académica (promedio)
- ☒ Baja voluntaria
- ☒ Falta de recursos económicos
- ☒ Dificultades de salud
- ☐ Servicios estudiantiles limitados
- ☐ Falta de recursos en el Programa
- ☐ Relaciones interpersonales con Facultad
- ☐ Limitaciones en el ofrecimiento académico
- ☐ Poca diversidad en el ofrecimiento
- ☐ Horario inconveniente
- ☐ Otras razones: _____

2. ¿Qué información se desprende del análisis de los datos incluidos en las tablas 4.3B a 4.7.B y de los criterios marcados en pregunta 2?

Los datos reflejan que el bajo por ciento de retención no está relacionado a que los estudiantes no puedan obtener incentivos económicos, puesto que todos los que solicitan se les otorga. Sin embargo, estos datos puede resultar engañosos porque el salario que reciben como ayudantes de cátedra es tan bajo que hay estudiantes que abandonan el programa para buscar un trabajo o trasladarse a otro programa graduado donde recibirán mayor salario que el que reciben en nuestro Programa.

3. ¿Qué acciones ha llevado a cabo el Programa para asistir a los estudiantes cuando desea darse de baja? ¿Cuáles debería tomar?

Los datos reflejan que una vez los estudiantes pasan de su segundo año, la retención por lo regular se mantiene estable. Por lo tanto, debemos enfatizar en dar apoyo y orientación a los estudiantes en esos primeros dos años en el programa para lograr subir el por ciento de retención.

4. Incentivos Económicos

En la siguiente tabla, registre la cantidad de estudiantes que han solicitado préstamos, ayudantías o becas en los pasados seis años²². En cada columna registre los datos correspondientes a la cantidad de solicitudes de incentivos y aquellos que fueron otorgados.

Tabla 4.7.B.

Año	Préstamos		Ayudantías ²³		Becas		Total estudiantes en el Programa	% de estudiantes con inventivos
	Solicitados	Otorgados	Solicitados	Otorgados	Solicitados	Otorgados		
2009-10	0		24	24	77	77	117	86%

2010-11	0		32	32	63	63	119	80%
2011-12	0		34	34	55	55	110	81%
2012-13	0		40	40	52	52	103	89%
2013-14	0		35	35	45	45	96	83%
2014-15	0		30	30	47	47	85	91%

- a. Compare la demanda de ayuda económica por parte de los estudiantes del Programa con el otorgamiento de los diferentes incentivos

La oferta de incentivos económicos cubre toda la demanda de ayuda económica por parte de los estudiantes.

²² Puede conseguir esta información en la Oficina de Asistencia Económica.

²³ Fondos institucionales recurrentes de las facultades, escuelas autónomas y del DEGI (FIPI, EAFs) otorgados con el fin de proveer incentivos económicos a estudiantes graduados para que se dediquen a tiempo completo a sus estudios y para promover el desarrollo de la investigación y actividad creativa en el Recinto. Estos incluyen ayudantías para experiencias de cátedra, experiencias de investigación o labor creativa y experiencias profesionales.

C. Graduación

1. Tiempo que tardan los estudiantes en completar el Grado

- a. ¿Muestra claramente el programa de estudios el tiempo que le tomará al estudiante completar el grado y el orden en que debe tomar los cursos y completar otras experiencias curriculares (si aplica) para terminar en el tiempo señalado?

☒ Sí ☐ No

- b. ¿Ofrece el Programa orientación sobre la importancia de seguir el secuencial curricular y las implicaciones de no seguirlo?

Se ofrece orientación a los estudiantes de nuevo ingreso al comienzo del año académico y el Reglamento del Programa Graduado también lo explica.

- c. ¿Cuál es el promedio del tiempo, en términos de años, que tardan los estudiantes en completar el grado de su Programa²⁴? Ph.D. de 8-10 años

- d. ¿Confrontan los estudiantes algún problema para completar el grado en el tiempo estipulado en programa de estudios?

Varios problemas como por ejemplo, huelgas en el Recinto, huracanes, equipos sin el mantenimiento requerido, falta de materiales, entre otros.

2. Tasa de Graduación

Utilizando como referencia la cantidad de estudiantes matriculados (Vea Tabla 4.3 B), indique en las siguientes tablas el número de estudiantes que se gradúan por año en el Programa de MA y el PhD. Escriba los datos en la columna que le corresponda al Programa.

Tabla 4.8.C. **MAESTRIA**

Año de admisión	# de estudiantes admitidos	# de estudiantes graduados en 2 años	# de estudiantes graduados en 3 años	# de estudiantes graduados en 4 años o más
2009-2010	4	0	0	1
2010-2011	6	0	0	4
2011-2012	8	0	0	1
2012-2013	16	0	0	2
2013-2014	5	0	0	2
2014-2015	0	0	0	1

Tabla 4.8.D **DOCTORADO**

Año de admisión	# de estudiantes graduados en 3 años	# de estudiantes graduados en 4 años	# de estudiantes graduados en 5 años	# de estudiantes graduados en 6 años	# de estudiantes graduados en 7 años o más
2009-2010	0	0	1	1	9
2010-2011	0	0	0	0	8
2011-2012	0	0	0	1	10
2012-2013	0	0	0	0	10
2013-2014	1	0	0	2	9
2014-2015	0	1	0	3	5

²⁴ Puede conseguir esta información en OPEP o el Registrador.

D. Egresados

1. ¿Tiene el Programa un sistema para darle seguimiento a sus egresados?

☒ Sí. (Pase a la pregunta 2.)

☐ No (Pase a la pregunta 5.)

2. ¿Cómo el Programa mantiene contacto con sus egresados?

Por correo electrónico, correo regular y teléfono

3. ¿Dónde se emplean los egresados del Programa y cuánto tiempo les toma en obtener empleo luego de graduarse?

Se emplean en industrias, universidades, gobierno, etc. Les toma alrededor de un mes en conseguir empleo.

4. ¿Cuál es el porcentaje de egresados que anualmente continúan estudios más avanzados?

80 %

5. Servicios de Apoyo

b. Consejería

¿Cómo implanta el Programa la consejería académica? ¿Cómo informa el Programa a sus estudiantes sobre requisitos, normativas y servicios institucionales del Recinto y del Programa? (Favor de incluir ejemplos de éstos en la sección de anejos)

Desde el nuevo ingreso se les provee por la página electrónica del Decanato de Estudios Graduados e Investigación (<http://graduados.uprrp.edu>) y Reglamento del Programa Graduado de Química (ver **Apéndice 6**) los requisitos, normativas y servicios institucionales del Recinto.

c. Procuraduría

¿Qué ha hecho el Programa para atender las situaciones o querellas de los estudiantes?
¿Cuáles han sido las causas más comunes de esas querellas? Promedio académico

Se someten al Comité de Asuntos Graduados.

A. Recursos Bibliográficos

SIAM (Electrónico 2015)	----	----	----	----	----	----	17
Springer	----	----	----	----	----	106	113
Taylor & Francis	----	----	----	----	----	49	57
Web of Science	----	----	----	----	----	3	3
Wiley	----	----	----	----	----	70	70
Totales	1,094	1,247	1,200	920	912	1,287	1,542

2. Indique la cantidad invertida en compra de recursos bibliográficos, el tipo de recurso y la cantidad de recomendaciones para compra de recursos bibliográficos emitidas por el profesorado.

Ver tabla adjunta.

Tabla 5.2.B.

Año	Cantidad invertida en compra de recursos bibliográficos	Tipo de recurso adquirido (libros, base de datos, material fílmico, revistas arbitradas, etc.)	Cantidad de recomendaciones para compra de recursos bibliográficos emitidas por la facultad
2009-10			
2010-11			
2011-12			
2012-13			
2013-14			
2014-15			

Tabla 1: Presupuesto Gastado por Tipo de Recurso y Año Fiscal

Tipo de Recurso	Año Fiscal 2009-10	Año Fiscal 2010-11	Año Fiscal 2011-12	Año Fiscal 2012-13	Año Fiscal 2013-14	Año Fiscal 2014-15
Libros	1,157.48\$	564.63\$	435.16\$	1,458.41\$	64.95\$	Presupuesto No Asignado
Libros (Cuenta Especial)	8,955.27\$	10,200.00\$	----	----	----	----
Continuaciones	5,861.75\$	8,225.12\$	3,473.44\$	5,461.55\$	13,459.19\$	14,955.19\$
Revistas Impresas	1,363,366.68\$	1,350,343.56\$	1,486,375.94\$	1,179,163.50\$	308,180.03\$	434,509.29\$
Recursos Electrónicos						

ACM Digital Library	----	----	----	----	5,632.04\$	Pagado por la Facultad
American Chemical Society	57,838.67\$	62,698.90\$	67,971.32\$	70,366.93\$	70,387.93\$	62,098.00\$
Annual Reviews	----	----	14,406.00\$	7,915.00\$	8,192.00\$	
BioOne	13,792.00\$	13,792.00\$	15,453.00\$	15,453.00\$	14,510.00\$	15,090.00\$
CRC Net	----	6,509.00\$	6,965.00\$	6,284.95\$	----	----
CRC Nutrition Netbase 2013	----	----	----	3,810.00\$	----	----
Cambridge University Press	----	----	----	----	20,581.32\$	21,368.00\$
Chemist	77.63\$	Título Descontinuado	----	----	----	----
Chicago University Press	----	----	----	----	3,158.97\$	3,216.00\$
Elsevier	735,143.69\$	748,857.00\$	783,757.63\$	824,086.26\$	865,953.61\$	737,223.52\$
Institute of Physics	----	----	----	----	67,123.60\$	68,653.00\$
Math Science	8,961.00\$	9,205.60\$	9,514.00\$	9,728.20\$	10,117.60\$	10,471.60\$
Oxford University Press	----	----	----	----	12,816.61\$	12,858.00\$
Sage Subscription	----	----	----	1,517.26\$	1,056.00\$	1,129.92\$
SciFinder	----	59,290.00\$	----	60,995.80\$	ACCESO ELECTRONICO GRATUITO	ACCESO ELECTRONICO GRATUITO
SIAM (Electrónico 2015)	----	----	----	----	----	\$ 7,825.00
Springer	----	----	----	----	326,001.73\$	438,396.00\$
Taylor & Francis	----	----	----	----	218,392.16\$	235,274.00\$
Web of Science (Biological Abstracts Zoological Record Journal Citation Report)	51,648.50\$	36,910.50\$	39,098.00\$	41,443.88\$	35,954.45\$	13,688.35\$
Wiley Subscription	----	----	----	----	282,172.07\$	290,637.16\$
% Gastos Consorcio	8,234.82\$	10,596.57\$	10,365.85\$	10,900.35\$	7,093.90\$	10,000.00\$
Total de Gastos	2,255,037.49\$	2,317,192.88\$	2,423,409.34\$	2,245,076.09\$	2,270,571.16\$	2,385,585.03\$
Presupuesto	3,872,719.44\$	3,762,296.79\$	4,153,416.56\$	3,844,191.04\$	4,152,001.72\$	3,753,141.00\$
Total Gastado Sistema de Bibliotecas						
% Gastos Ciencias Naturales	58.22%	61.15%	58.34%	65.71%	55.00%	63.56%

3. ¿Qué relación existe entre la investigación generada por el Programa (y su Centro de Investigación) con los recursos bibliográficos disponibles por medio del Recinto? ¿Posee el Programa acceso a revistas y recursos adecuados y suficientes para desarrollar y sostener la investigación?

Hacer investigación de punta requiere tener conocimiento constante de los últimos avances en la disciplina; tener acceso a recursos bibliográficos es esencial. La crisis fiscal ha limitado el acceso a recursos bibliográficos desde hace muchos años y aunque hay acceso de forma electrónico a importantes recursos, no es tan abarcador como para hacerlo adecuado para desarrollar y sostener la investigación.

4. ¿Son los recursos bibliográficos disponibles los que el Programa necesita para su funcionamiento óptimo? ¿Qué, si algo, sugiere modificar?

Los recursos bibliográficos disponibles son necesarios, pero no son suficientes. Sugerimos modificar el acceso electrónico para hacerlo más abarcador.

5. ¿Cuál es la disponibilidad de los recursos existentes? ¿Están los recursos electrónicos accesibles cuando los estudiantes los necesitan? ¿Son fáciles de obtener en su versión completa? ¿Están los recursos impresos ordenados y en buen estado?

Los recursos existentes están disponibles parcialmente. Particularmente para los electrónicos hay ocasiones en que no están disponibles por problemas con la red o porque la UPR no tiene licencia. Los recursos impresos están ordenados y la mayoría en buen estado.

B. Recursos Tecnológicos

- 1 Cursos – Haga una lista de los cursos que ofrece el Programa en los que se utiliza la tecnología para algo más que para procesar textos, por ejemplo: manejo de estadísticas, simulaciones, manejo de datos, traducción o lenguas, educación a distancia, tecnología para el aprendizaje, cursos en línea, diseño de páginas de Internet, Blackboard, entre otros.

Tabla 5.4.C.

Código del Curso	Título	Tipo de recurso tecnológico
QUIM 6011	Teoría de Química Inorgánica I	Blackboard
QUIM 6012	Teoría de Química Inorgánica II	Blackboard, Next, Google Drive and a Weebly page
QUIM 6215	Teoría de Química Analítica	Blackboard
QUIM 6225	Teoría de Análisis Instrumental	Blackboard
QUIM 6411	Teoría de Química Orgánica I	Blackboard
QUIM 6412	Teoría de Química Orgánica II	Blackboard, PPT slides, Internet pdf scanning and file transfers, problem reference solutions and evaluation
QUIM 6611	Química Física Avanzada I	Blackboard
QUIM 6612	Química Física Avanzada II	Website, e-mail communications
QUIM 6811	Bioquímica Avanzada I	Blackboard
QUIM 6812	Bioquímica Avanzada II	Blackboard
QUIM 6905	Principios y Prácticas de Química I	Blackboard
QUIM 6906	Principios y Prácticas de Química II	Blackboard
QUIM 8990	Tópicos Especiales en Química Inorgánica	Blackboard
QUIM 8992	Tópicos Especiales en Química Analítica	Blackboard
QUIM 8994	Tópicos Especiales en Química Orgánica	Blackboard
QUIM 8996	Tópicos Especiales en Química Física	Website, e-mail communications

- a. Investigación - ¿Tiene el Programa proyectos de investigación o enseñanza que requieran tecnología exclusivamente dedicada a los mismos?

☒ Sí. ¿Cuáles?

☐ No

□ Profesores que hacen química computacional, como el Profesor Zhonfang Chen (ver <http://chemistry.uprrp.edu/chen/index.htm>), hacen uso de computadoras y programado exclusivamente dedicados a esos proyectos de investigación. Hay computadoras y programados exclusivos para instrumentación científica, algunas de uso compartido.

C. Plan de Tecnología

1. ¿Cuenta el Programa con un Plan de Tecnología adecuado? ☐ Sí ☒ No
- a. ¿Incluye el plan la adquisición, actualización, mantenimiento distribución y reposición de tecnología? ☐ Sí ☐ No
- b. ¿Incluye el adiestramiento del personal docente y no docente?
- c. ¿Contempla el adiestramiento de los estudiantes? ☐ Sí ☐ No
- d. ¿Cuenta el Programa con un presupuesto para la implantación, desarrollo y mantenimiento del Plan de Tecnologías?
☐ Sí ☐ No
- e. ¿Considera el Plan una partida dentro de su presupuesto para mantenimiento y actualizaciones (upgradings) para los recursos tecnológicos, por ejemplo: sistemas operativos, Programas de computadoras, memoria, entre otros? ☐ Sí ☐ No
- f. ¿Considera el plan la ampliación de recursos, servicios y horarios? ☐ Sí ☐ No

D. Análisis

Evalúe cuán adecuados son los recursos tecnológicos del Programa para promover la productividad y la excelencia en la docencia de sus profesores.

1. ¿Es la proporción de estudiantes por computadora adecuada²⁵? ☐ Sí ☒ No

□ (Por favor explique) La mayoría de los estudiantes matriculados en el Programa poseen una computadora portátil y hacen sus trabajos y accesan la red de Internet a través de ella. El Programa no posee computadoras más allá de las que poseen las Secretarías del programa. Como cada una de las dos secretarías asignadas al Programa tiene asignada a su vez una computadora "desktop", si usáramos ese número para hacer un cálculo de la proporción de estudiantes por computadora, daría un número de 42 para el Año Académico 2014-2015. Pero la realidad es que los estudiantes, si no tienen computadora portátil, utilizan las computadoras que tiene profesores del programa en sus laboratorios.

2. ¿Son los Programas disponibles suficientes y adecuados para la demanda de los usuarios? ☐ Sí ☒ No

□ (Por favor explique) Hace falta más Programas adecuados para la demanda de usuarios si se fueran a estar usando individualmente cada uno. Sin embargo, el reciente acceso a la aplicación MS Office 365 por el portal de la Universidad permite utilizar esas aplicaciones. ar.atís. brindado así acceso a todos los estudiantes.

3. ¿Son las funciones de estas instalaciones del personal, de los servicios ofrecidos, cónsonas con las necesidades de los usuarios y expectativas de desarrollo del Programa?

Las instalaciones que utilizan los egresados, estudiantes y profesores, aparte de lo que cada profesor tiene en su laboratorio de investigación, consisten mayormente de lo que provee CITEC en la Biblioteca Néstor Rodríguez Rivera en la Facultad de Ciencias Naturales. Estas instalaciones son cónsonas con las necesidades de los usuarios en cuanto a ofrecer talleres sobre utilizar programado de MS Office, sobre creación de fichas bibliográficas, sobre el uso de EndNote Web y sobre comunicación erudite, entre otros. CITEC tiene la lista de adiestramientos disponibles en http://www.bcn.uprrp.edu/literacy/courses_spanish.html.

4. ¿Cuán adecuadas son las instalaciones, los recursos bibliográficos y el equipo tecnológico para las necesidades de los usuarios y las expectativas de desarrollo del Programa?

El uso de tecnología se ve limitado por la falta de acceso constante a la red de Internet. El acceso a cables de Ethernet está muy limitado en el Edificio Facundo Bueso donde están la mayoría de las oficinas de profesores, estudiantes y laboratorios del Programa. Por otro lado, la señal de Wifi del Recinto tiene acceso esporádico e inconsistente. Hace falta mejorar este acceso al Internet en el edificio para poder sacar el máximo de provecho a esta herramienta.

5. ¿Qué necesita hacer el Programa para actualizar los recursos bibliográficos, mejorar la infraestructura física, adquirir y mantener recursos tecnológicos adecuados?

Conseguir más asignaciones de fondos para actualizar y mantener todos estos recursos.

²⁵ La proporción de estudiantes por computadora se refiere a la cantidad de estudiantes matriculados dividida entre la cantidad de computadoras que posee el Programa

V. Gerencia, Planificación y Desarrollo

A. Estructura Organizativa, Políticas y Procedimientos

1. Prontuarios, catálogo graduado y publicidad del Programa

a. ¿Cómo difunde el Programa la Misión, sus Metas y Objetivos?

☒ Opúsculos

☒ Página electrónica

☒ Tablón de edictos

☐ Otro: _____

b. ¿Cumplen los prontuarios del Programa con las normas institucionales, del CEPR y la MSA? ☒ Sí ☐ No

c. ¿Cuál fue el resultado de la más reciente actualización del Catálogo de Cursos Graduados? Marque con una (X) todas las que apliquen.

☐ Se eliminaron cursos del Catálogo, así como del Archivo de Administración Central.

☐ Se añadieron cursos. ¿Cuántos? ____

☐ Se actualizaron cursos, pero no surgieron cambios adicionales a los ya registrados oficialmente.

☐ Se solicitó la actualización de cursos y estamos en el proceso de oficializar los cambios.

☒ No se actualizó

d. ¿Mediante qué herramientas logra exposición o se promociona el Programa?

☒ Opúsculo

☐ Hojas Sueltas

☒ Página electrónica

☐ Medios de comunicación masiva. ¿Cuáles? _____

☐ Otros _____

e. ¿Cumple esa promoción con las normas institucionales del CES y de la MSA?

☒ Sí

☐ No

☐ Por favor, explique. Si no cumple, indique qué medidas se tomarán para lograr su cumplimiento.

2. ¿Cómo comunica la gerencia académica del Programa las normativas institucionales vigentes? ¿Cómo logra el cumplimiento de las mismas?

La gerencia académica comunica las normativas institucionales vigentes en las reuniones del Programa Graduado de Química.

B. Adiestramiento

1. ¿Con qué frecuencia el personal administrativo y de apoyo participa en conferencias, talleres y seminarios de mejoramiento profesional? Marque con una (X).

☒ Mensualmente

☐ Semestralmente

☐ Anualmente

☐ Otro _____

2. Indique los talleres o conferencias a los que han asistido en el último año académico.

3. ¿Son las actividades de desarrollo profesional adecuadas y suficientes para promover el funcionamiento eficiente del Programa y mejorar los servicios que ofrece el mismo?

4. ¿Con qué frecuencia se evalúa el desempeño del personal administrativo y de apoyo? Marque con una (X).

☐ Mensualmente

☐ Semestralmente

☐ Anualmente

☐ Otro _____

☐ No se evalúa

5. ¿Qué efecto tienen las evaluaciones de personal (si alguna) en el desempeño del mismo?

C. Reclutamiento

Facultad:

1. ¿Tiene el Programa un plan de reclutamiento y desarrollo de facultad?

☒ Sí. Conteste: ¿Cuán eficaz ha sido el mismo? ¿Toma ese plan en consideración el retiro de profesores y los cambios de énfasis en el área de estudio? (Incluya copia del Plan en los anejos)

☐ No. Conteste: ¿Cuáles son las prácticas y procedimientos de reclutamiento de profesores?

Para mantener la productividad del Departamento en publicaciones y subvenciones aprobadas, el Plan de Reclutamiento (**Apéndice 7**) busca reemplazar a facultativos retirados y que dejan el programa. También el nuevo personal reclutado ayuda a satisfacer las necesidades de enseñanza del programa subgraduado.

A principios del año 2014 de un total de 33 plazas “full-time tenured track”, solo 24 estaban siendo ocupadas. En el 2012 dos profesores de la División de Química Física se retiraron luego de que otro profesor se había retirado dos años antes. Para llenar esas tres posiciones se nos otorgó dos posiciones para llenar con profesores en el área de Química Física. Eso llevó al proceso de reclutamiento y a otorgar una plaza probatoria al Dr. Pasquale Fulvio quien trabaja en el área interdisciplinaria de nuevos materiales con aplicaciones en conversión y almacenamiento de energía y en la síntesis de nuevos catalizadores heterogéneos. La otra posición se mantuvo vacante puesto que ningún candidato apropiado solicitó. Desde esos años hasta ahora otro profesor del área de química física también se retiró.

En el área de Bioquímica, luego de que tres profesores decidieran renunciar a su plaza en nuestro recinto, solo quedaron dos profesores en esa área, uno de los cuales está mayormente envuelto en la administración de programas federales de entrenamiento (RISE, MARC, entre otros), lo que deja a un solo profesor en el área para cubrir cursos graduados y subgraduados y los cursos avanzados en el programa graduado (a nivel 8000), además para ofrecer mentoría al alto número de estudiantes en el programa interesados en el área de Bioquímica. Sin embargo, aunque se anunciaron dos plazas disponibles en Bioquímica, no se recibieron solicitudes adecuadas para esas posiciones. Se está buscando llenar una plaza con una persona interesada en el área de estudios estructurales de proteínas, para aprovechar la disponibilidad de nuevos espectrómetros de masa y un espectrómetro de resonancia magnética nuclear de 700 MHz que se encuentran en el Centro de Investigación en Ciencias Moleculares. Una persona ya aceptó la oferta y debe estar comenzando labores en agosto de este año.

En el área de Química Analítica, un área de mucha demanda estudiantil, recientemente se reclutaron dos nuevos profesores, el Dr. Eduardo Nicolay y la Dra. Vilma López Mejías. La Dra. López Mejías trabaja en el área de nuevos polímeros de compuestos farmacéuticos usando heteronucleación inducida por polímeros. Esta área de investigación debe de ser atractiva a la industria farmacéutica local y ser candidata a colaboraciones. Por otro lado, el Dr. Nicolay dentro del plan de reclutamiento se nombró para trabajar con biomateriales, catálisis y nanotecnología aplicada, para establecer colaboraciones con NASA.

2. ¿Son las prácticas y procedimientos afines con la intención de reclutar al personal más idóneo según las metas, objetivos y expectativas de desarrollo del Programa y del Recinto?

Las prácticas y procedimientos son afines con esa intención.

3. ¿A qué problemas se enfrenta el Programa a la hora de reclutar profesores?

El mayor problema que enfrenta el Programa a la hora de reclutar profesores es no ser competitivos ni en el salario ni en el paquete de fondos semilla ni en el salario de estudiantes graduados, todos los cuales están muy por debajo de la norma en instituciones de "ranking" similar al nuestro. Los renglones de fondos de viaje, licencias sabáticas y fondos semillas para el reclutamiento de nuevos profesores (\$150,000) son limitadas y no competitivas al compararlos con los programas graduados cuya clasificación aspiramos alcanzar cuyos fondos semilla oscilan entre \$300,000 a \$750,000 (dato provisto por los Directores de Departamento de New Mexico State University y Florida State University. Además, en Florida State University la oferta inicial en fondos semilla incluye salario de un estudiante postdoctoral por dos años que incluye su plan médico, salario para dos estudiantes graduados por dos años, salario para el profesor por los dos meses de verano, fondos para viajes para participar en dos reuniones anuales por tres años y fondos para instrumentación de acuerdo a las necesidades del investigador).

Por otro lado el salario que se le ofrece a los estudiantes reclutados como ayudantes de cátedra o de investigación no es competitivo; actualmente es \$8,720 a nivel de maestría y \$10,900 (por diez meses) a nivel doctoral, lo que no permite atraer al Programa los mejores estudiantes del país e internacionales que puedan nutrir el programa y la investigación de los profesores de nuevo reclutamiento. Esto no compara con lo ofrecido por otros programas. Por ejemplo, el salario para estudiantes graduados de química en la Universidad de Nuevo México es \$21,700 por once meses y en Florida State University es \$23,500 por 12 meses.

4. Enumere las prioridades del reclutamiento de profesores para los próximos cinco años.

D. Comités Permanentes

1. ¿Cuáles son los Comités Permanentes que posee el Programa?

Comité de Admisiones
Comité Asuntos Académicos Graduados
Comité de Avalúo del Aprendizaje

2. ¿Cumplen con las tareas que se proponen anualmente? ¿Funcionan eficazmente los comités?

Sí, cumplen con sus tareas y funcionan eficazmente.

3. ¿Tiene el Programa una Junta Externa? ☐ Sí ☒ No

E. Relaciones con la comunidad

1. ¿Existe evidencia de vínculos entre el Programa, el sector privado y el gubernamental? ¿Mediante qué iniciativas se mantienen?

Hay vínculos a través de las investigaciones de los profesores y a través de apoyo para seminarios y actividades del programa.

2. ¿Con qué otras unidades del Recinto el Programa tiene relaciones directas y colaborativas?

Facultad de Educación.

3. ¿Es adecuada la relación entre el Programa y otras unidades académicas de la Facultad,

incluyendo la Oficina del Decano?

Sí, es adecuada, más ahora que se creó el Decanato Auxiliar de Estudios Graduados e Investigación.

4. ¿Mediante qué iniciativas o proyectos concretos mantiene el Programa su relación con la comunidad externa? ¿Cómo participan los miembros del Programa en el servicio a la comunidad externa?

El Programa como tal no, pero miembros del programa tienen iniciativas de relación con la comunidad externa a través de programas de "outreach".

5. ¿Tiene o ha tenido el Programa proyectos de Práctica Intramural? Si es así, por favor inclúyalos en el espacio a continuación.

El Programa no tiene ni ha tenido proyectos de Práctica Intramural.

F. Plan de Desarrollo

1. ¿Cuenta el Programa actualmente con un Plan de Desarrollo? ☐ Sí ☒ No

La última autoevaluación del Programa se hizo en el 2004 y no hemos encontrado copia de un Plan de Desarrollo.

(Si su respuesta fue Sí, por favor, inclúyalo como anejo.) ☐ Sí ☐ No

2. ¿Tiene el Programa unas expectativas de desarrollo definidas? ☐ Sí ☒ No

El Coordinador del Programa Graduado presenta a principio de cada año académico su plan de trabajo para ese año académico, pero éste no constituye en sí un Plan de Desarrollo.

Las expectativas de desarrollo del Programa se definirán como parte de la revisión de la Maestría y el Doctorado que se está llevando a cabo durante este año académico y en el ejercicio de desarrollar un Plan de Desarrollo a 5 años como paso final de este proceso de Autoestudio.

3. ¿Han sido estas expectativas discutidas y aprobadas por su profesorado? ☐ Sí ☐ No

N/A (ver respuestas anteriores)

4. ¿Qué mecanismos se han utilizado para discutir y divulgar el Plan de Desarrollo entre la facultad del Programa?

N/A (ver respuestas anteriores)

5. El Plan de Desarrollo del Programa es: (marque todas las que apliquen)

N/A (ver respuestas anteriores)

☐ Razonable y
realizable

☐ Actualizado
☐ Establece prioridades (metas)

☐ Define objetivos y actividades Asigna personas responsables

☐ Toma en consideración el sitio al que la facultad aspira conducir el Programa

☐ Establece fechas límites para la consecución de cada tarea

G. Presupuesto

1. ¿Cuenta el Programa con un Presupuesto Operacional propio?
☐ Sí. (Incluya copia del mismo en la sección de Anejos)
☒ No
2. ¿Toman en cuenta las partidas del Presupuesto Operacional las prioridades establecidas en el Plan de Desarrollo? ☐ Sí ☒ No
3. ¿De qué manera participa la facultad y los estudiantes en el diseño del Presupuesto Operacional del Programa, su utilización y evaluación de los resultados?

De ninguna manera.

4. ¿Cuán diverso es el portafolio de ingresos fiscales del Programa? ¿Qué iniciativas contempla el Programa para allegar recursos fiscales adicionales? ¿Cuenta el Programa con un plan para identificar y solicitar fondos externos?

El programa no cuenta con presupuesto asignado a él. Cada profesor en su carácter individual solicita fondos de investigación a agencias locales y estatales.

Según datos del National Science Foundation, en el 2013 el Departamento de Química del Recinto de Río Piedras obtuvo el 90% de fondos de investigación y desarrollo de fondos externos y 10% proviene de fondos institucionales. Esto compara con el Departamento de Química de Florida State University donde el 70% son fondos externos, 30% institucionales.

Alianzas de investigadores individuales con industrias tales como Eli Lilly han permitido allegar algunos fondos para conferenciantes, becas de estudiantes, materiales y equipos adicionales.

H. Análisis

1. ¿Se percibe a la gerencia del Programa como un agente de cambio?

De acuerdo a las encuestas hechas a los profesores, los estudiantes actuales en el programa y a los egresados, que fueron hechas para completar esta evaluación, éstos no perciben a la gerencia como un agente de cambio.

2. ¿Cuáles son los mayores retos administrativos que el Programa enfrenta en la actualidad?
¿Qué medidas debe tomar para afrontarlos?

Falta de presupuesto y recursos para actualizar la página electrónica, comprar materiales para investigación y equipos menores. Igualmente, hace falta crear un ambiente entre estudiantes y profesores para trabajar hacia el bien común de todos en el programa.

En el plan de desarrollo para los próximos cinco años que estaremos trabajando este año como parte del este proceso de Autoestudio vamos a hacer una evaluación de las medidas que debemos tomar para afrontar estos retos administrativos. Los mismos serán presentados al Director del Departamento, Decano de la Facultad, y Decano de Estudios Graduados e Investigación para la implementación de las medidas sugeridas.

3. ¿Ofrece el Programa a sus estudiantes, egresados y profesores un servicio de excelencia en todas sus áreas? ¿Hay algún área de servicio que requiera especial atención? ¿Qué ajustes o inversión adicional se requeriría para elevar la calidad del Programa?

De acuerdo a las encuestas administradas a los profesores, a los estudiantes actuales en el programa y a los egresados, no se ha ofrecido un servicio de excelencia en todas las áreas. Entre las áreas de servicio que requieren especial atención está la página electrónica del Departamento, dentro de la cual está la parte correspondiente al Programa Graduado, y la orientación regular y mentoría a los estudiantes sobre todos los requisitos del programa.

La calidad del Programa en estas áreas de servicio se puede elevar asegurando que la página electrónica se mantenga al día y se lleve a cabo un rediseño que la haga más atractiva y relevante a los estudiantes. Para mejorar la orientación y mentoría que se le ofrece a los estudiantes, hace falta proveer talleres a los profesores y estudiantes sobre ofrecimientos académicos, normas y el reglamento del programa, requisitos departamentales, oportunidades de becas y ayudantías, funciones y deberes del mentor, entre otras.

4. ¿Le parece que el apoyo recibido de la alta gerencia universitaria ha sido adecuado para atender las necesidades y aspiraciones del Programa?

En las evaluaciones anteriores del Programa Graduado se han presentado básicamente los mismos problemas año tras año, pero no se ha recibido la ayuda esperada, particularmente en fondos adicionales, por parte de la alta gerencia universitaria.

5. ¿Qué políticas o procedimientos (si alguno) relacionados a la alta gerencia universitaria considera que se deberían modificar para facilitar el funcionamiento y el desarrollo del Programa? ¿Cuáles son sus recomendaciones?
 - a. Asignar un presupuesto para el Programa Graduado de Química.
 - b. Establecer un plan de orientación constante a estudiantes graduados.
 - c. Ofrecer un plan de mentoría de pares para los nuevos profesores reclutados y para los nuevos estudiantes en el Programa.
 - d. Una vez se entregue el Plan de Desarrollo de cinco años, la alta gerencia se debe reunir con la gerencia del programa para discutir la asignación de tareas, responsabilidades y recursos para establecer el plan de acción que permita llegar al nivel de excelencia esperado.

VI. *Avalúo del Aprendizaje Estudiantil*

A. Implantación

Conteste en qué se diferencian las medidas recogidas de las que fueron propuestas en la Guía de Implantación del Avalúo del Aprendizaje:

1. ¿Cuántos estudiantes participaron en las actividades de avalúo?

Seminario graduado: 6 estudiantes

Disertación de tesis: 9 estudiantes

2. ¿Qué competencias se midieron?

Investigación y creación, comunicación efectiva y pensamiento crítico.

3. ¿Qué instrumentos se utilizaron?

Se utilizaron los siguientes instrumentos de evaluación:

(c) Evaluation form for graduate Chemistry Seminar y Thesis Seminar
Presentation Rubric: Overall quality of science

(d) Thesis Seminar Presentation Rubric: Quality of oral communication, Overall quality of presentation

4. ¿Hubo algún cambio con respecto al plan original? Explique.

No hubo cambio con respecto al plan original.

5. ¿Surgieron imprevistos durante la implantación? Explique.

No, se lograron todas las metas y proyecciones.

6. ¿Cuenta el programa con un Plan de Avalúo a 5 años? Provea el Plan de Avalúo detallado con el que cuenta el Programa (Ver **Apéndice 8**).

El programa cuenta con un Comité de Evaluación el cual estará dedicándose a preparar el Plan de Avalúo para los próximos 5 años. Se cuentan con los planes de los años 2004-2009 y del 2009-2010 hasta 2013-2014 como modelo para la preparación del mismo (ver apéndice).

B. Análisis

1. ¿Se puede detectar alguna relación entre el desempeño de los estudiantes en la investigación y las destrezas de pensamiento crítico de los estudiantes antes de empezar la tesis?

En este momento no se puede detectar una posible relación, pero estamos involucrados en una revisión curricular del programa doctoral que pudiera arrojar luz sobre alguna posible relación entre el desempeño de los estudiantes en la investigación y las destrezas de pensamiento crítico de los estudiantes antes de empezar la tesis.

2. ¿Se puede detectar alguna posible relación entre el desempeño de los estudiantes en la investigación y factores relacionados al diseño e implantación del currículo y el programa?

En este momento no se puede detectar una posible relación, pero estamos involucrados en una revisión curricular del programa doctoral que pudiera arrojar luz sobre alguna posible relación entre el desempeño de los estudiantes en la investigación y factores relacionados al diseño e implantación del currículo y el programa.

3. ¿Qué otros factores que no se encuentran contenidos en esta sección de Análisis pudieron haber contribuido o entorpecido el logro de los resultados esperados?

No hemos podido analizar un cohorte de estudiantes para seguir su desempeño en todos los requisitos del programa hasta completar el mismo, por lo que no hemos podido hacer este análisis.

4. ¿Qué actividades de evaluación se podrían llevar a cabo en el futuro para profundizar en el conocimiento de los problemas identificados o identificar con mayor certeza otros posibles factores que contribuyeron o entorpecieron el logro de los resultados esperados?

Según fuimos informados por el Decanato de Estudios Graduados e Investigación, este año todos los programas graduados implantarán un cuarto criterio: Conocimiento, destrezas y aptitudes propias de la disciplinas.

Appendix Section

Appendix 1

Advisor	Student	year of the presentation/publication	research title presented
Dr. Carlos Cabrera	Luis E. Betancourt	2014	Ce impregnation at RoDSE electrodeposited Au on Vulcan XC-72R for Ethanol Oxidation in Alkaline Media
		2014	
		2014	
Dr. Carlos Cabrera	Nadja E. Solis-Marcano	2014	The Electrochemical Capacitive Label-Free Detection of DNA Modification and Hybridization Process Using Interdigitated Gold Microelectrodes
Dr. Carlos Cabrera	Nadja E. Solis-Marcano	2015	Non-faradaic unlabeled electrochemical capacitive detection of DNA modification and hybridization process using custom-made gold interdigital microelectrode arrays
Dr. Carlos Cabrera	Nadja E. Solis-Marcano	2015	Non-faradaic unlabeled electrochemical capacitive detection of DNA modification and hybridization process using custom-made gold interdigital microelectrode arrays
Dr. Carlos Cabrera	Diana C. Díaz-Cartagena	2014	Impedimetric Detection of DNA Elongation by Electrochemical Impedance Spectroscopy
Dr. Carlos Cabrera	Diana C. Díaz-Cartagena	2015	Impedimetric Detection of Telomerase Activity in Cancer Cells.
Dr. Carlos Cabrera	Carlos A. Vélez	2015	Rotating disk slurry electrodeposition of palladium nanoparticles on highly conductive Vulcan XC – 72R for enhanced ethanol electro – oxidation in alkaline media
Dr. Carlos Cabrera	Carlos A. Vélez	2015	
		2014	

Dr. Carlos Cabrera	Carlos A. Vélez	2014	
Dr. Carlos Cabrera	Carlos A. Vélez	2013	
Dr. Carlos Cabrera	Amal Suleiman	2015	Environmental Soil Chemistry
Dr. Carlos Cabrera	Amal Suleiman	2014	Platinum Electrodeposition at unsupported Electrochemically Reduced Nanographene oxide for Enhanced Ammonia Oxidation
Dr. Carlos Cabrera	Amal Suleiman	2014	Platinum Electrodeposition of Y-Zeolite/Carbon Vulcan XC-72R support for Methanol Oxidation in Alkaline Media
Dr. Carlos Cabrera	Myreisa Morales Cruz	2015	Microbial Ureolysis Self-Sustaining System for the recycling of urine
Dr. Carlos Cabrera	Myreisa Morales Cruz	2015	Robust Microbial Ureolysis Self-Sustaining System for the Removal of Urea from Urine
Dr. Carlos Cabrera	Roberto A. Martínez-Rodríguez	2015	Effect of adsorbates and precursors in the synthesis of well-defined
Dr. Carlos Cabrera	Roberto A. Martínez-Rodríguez	2015	Síntesis y propiedades electrocatalíticas de nanopartículas de Pt y
Dr. Carlos Cabrera	Xinyu Liu	2015	Electrochemical synthesis of carbon quantum dots by RoDSE
Dr. Carlos Cabrera	Juan Corchado García	2014	Synthesis and Characterization of TiO ₂ Supported Pt Nanoparticles via Photodeposition: Probing the Mechanism with In-Situ FT-IR Spectroscopy
Dr. Carlos Cabrera	Juan Corchado García	2014	Cerium Oxide as a Promoter for the Electro-Oxidation Reaction of Ethanol: In-situ XAFS Characterization of the Pt Nanoparticles Supported on CeO ₂ Nanoparticles and Nanorods
Dr. Carlos Cabrera	Juan Corchado García	2014	In-situ XAFS Characterization of the Pt Nanoparticles Supported on CeO ₂ Nanoparticles and Nanorods
Dr. José M. Rivera	Luis A. Prieto Costas	2014	Sugar-responsive G-quadruplexes: Initial studies of a glucose-responsive system.

Dr. José M. Rivera	Luis A. Prieto Costas	2014	Initial Studies Towards Sugar-Responsive Supramolecular G-Quadruplexes.
Dr. José M. Rivera	Luis A. Prieto Costas	2015	Synthesis and Self-assembly Studies of Sugar-containing Guanosine Derivatives.
Dr. José M. Rivera	Luis A. Prieto Costas	2015	Determination of pKa and molecular modeling studies to understand the formation of sugar-responsive supramolecular G-quadruplexes.
Dr. José M. Rivera	Maxier Acosta Santiago	2011	Molecular Dynamics Simulations of Li ⁺ Cation Interactions in the Self-Assembly of Guanosine Derivatives
Dr. José M. Rivera	Maxier Acosta Santiago	2012	Atomistic Molecular Dynamics Simulations of Supramolecular G-quadruplexes of Different Molecularities
Dr. José M. Rivera	Maxier Acosta Santiago	2013	Molecular dynamics simulations of lipophilic and hydrophilic supramolecular G-quadruplexes
Dr. José M. Rivera	Maxier Acosta Santiago	2015	Elucidating Binding Interaction of 8-Arylguanosine Derivatives with Toll Like Receptors 7 and 8 by Computational Docking Experiments
Dr. Eduardo Nicolau	Jairo Herrera Morales	2015	Characterization of cellulose nanocrystals (CNCs) extracted from wood for use in water remediation of contaminants of emerging concern
Dr. Arthur D Tinoco	Annelis Sanchez	2015	A Peptide-Based Drug Design to Overcome Major Challenges on Cancer Treatments
Dr. Arthur D Tinoco	Annelis Sanchez	2015	Ti(IV) Peptide based Drug Design and Iron Depletion in Anticancer Research
Dr. Arthur D Tinoco	Annelis Sanchez	2015	Ti(IV) Peptide based Drug Design and Iron Depletion in Anticancer Research
Dr. Olga L. Mayol Bracero	Carlos J. Valle Diaz	2014	Impact of long-range transported African dust events on cloud chemistry at a Caribbean tropical montane cloud forest
Dr. Olga L. Mayol Bracero	Carlos J. Valle Diaz	2014	

Dr. Olga L. Mayol Bracero	Carlos J. Valle Diaz	2016	Understanding the Effect of African Dust Aerosols on Cloud Properties and Precipitation in Puerto Rico using the WRF model
		2016	
Dr. Olga L. Mayol Bracero	Carlos J. Valle Diaz		
Dr. Liz M. Diaz	Carlos J. Valle Diaz	2015	Nature and Technology in Parallel: An interdisciplinary module of Science-Technology-Art-Mathematics (STEAM) for 8th-12th grade students
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	Catalytic Hydrothermal Liquefaction of the Macro-alga Ulva Fasciata
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	Hydrothermal liquefaction of demineralized macroalgae biomass for bio-crude production
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	Biosynthesis of Gold Nanoparticles using Osmudaria Obtusiloba Extract and their Potential use in Optical Sensing Applications
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	Catalytic Hydrothermal Liquefaction of the Macro-alga Ulva Fasciata
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	Algal blooms: a case study to teach sustainability
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2015	
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2014	Hydrothermal Liquefaction of Marine Biomass for Bio-crude Production
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2014	Demineralization of Sargassum spp. Macroalgae Biomass: Selective Thermochemical Liquefaction Process for Bio-oil Production
Dr. Liz M. Díaz	Arnulfo Rojas Pérez	2014	Catalytic upgrading of biofuels from macroalgae

Dr. Liz M. Díaz	Rodolfo Cintrón León	2015	Fabrication of hydrogel from marine based polysaccharides for sensing and remediation applications
		2015	Vibrio fischeri: a biological element for the detection and monitoring of emerging organic pollutants in the San Juan Bay Estuary
Dr. Liz M. Díaz	Marielys Torres Díaz		
Dr. Ana R. Guadalupe	Yanira Enríquez	2014	<i>Biosensor for the detection of the ADP-Rybosylation of eEF2</i>
Dr. Ana R. Guadalupe	Yanira Enríquez	2014	<i>Electrochemical Sensors for Applications in Human Health</i>
Dr. Ana R. Guadalupe	Yanira Enríquez	2014	<i>Development of An Electrochemical Biosensor for Detecting the ADP-Ribosylation of Proteins by Pathogen Toxins</i>
Dr. Ana R. Guadalupe	Yanira Enríquez	2015	Synthesis and Characterization of a ferrocene-modified coenzyme for electrochemical biosensor applications
Dr. Zhongfang Chen	Shiru Lin	2015	Computational design of porous materials for energy applications
Dr. Edwin Quiñones	Yong Ge Lin	2015	Implementation of Various Modalities of the Optical-Optical Double Resonance Techniques to Simplify the Interpretation of the Spectra of Highly Excited States of Nitric Oxide
Dr. Jorge L. Colón	Julissa González Villegas	2015	Cointercalation of Doxorubicin and Cisplatin Anticancer Drugs into Zirconium Phosphates Nanoparticles for Drug Delivery Applications
Dr. Jorge L. Colón	Julissa González Villegas	2015	Derivatization of Zirconium Phosphates Surface with Polyethylene Glycol Monophosphate for Active Targeting: Potential Nanocarrier of Doxorubicin Anticancer Drug.
Dr. Jorge L. Colón	Julissa González Villegas	2015	Cointercalation of Doxorubicin and Cisplatin Anticancer Drug into Zirconium Phosphate and Surface Derivatization of Nanoplatelets for Active Targeting
Dr. Jorge L. Colón	Barbara Casañas Montes	2015	Metallocene dichlorides intercalation into inorganic layered nanomaterial zirconium phosphate for potential cancer therapy
Dr. Jorge L. Colón	Barbara Casañas Montes		Inorganic Layered Nanomaterial for Potential Cancer Therapy

Dr. Jorge L. Colón	Barbara Casañas Montes	2015	CCI Solar Army-Caribbean Brigade Workshops for teacher and students
Dr. Abel Baerga	Yermay Morales Lozada	2015	Chemical Composition of Lipopolysaccharides (LPS) Extracted from Clinical Isolates of Escherichia coli
Dr. Abel Baerga	Yermay Morales Lozada	2015	Strategies Toward the Isolation of Predicted
Dr. Kai Griebenow	Hernández-Cancel G		Genotoxic Compound, Colibactin
		2015	
Dr. Kai Griebenow			
	Figueroa CM	2015	
Dr. Kai Griebenow	Saxena M		
		2015	
Dr. Kai Griebenow	Delgado Y		
		2015	
Dr. Kai Griebenow	Anna Molina		
		2015	
Dr. Kai Griebenow	Delgado Y		
		2015	
Dr. Kai Griebenow	Griselle hernández		

Dr. Kai Griebenow	Pagán M	2014	
Dr. Kai Griebenow	Morales-Cruz M	2014	
Dr. Kai Griebenow	Yamixa Delgado	2014	
Dr. Kai Griebenow	Nicolau E	2014	
Dr.Kai Griebenow	[83] Pagán M	2014	A comoparative study of different protein immobilization methods for the construction of an efficient nano-structured lactate oxidase-CNT-biosensor
Dr.Kai Griebenow	[86] Moraima Morales-Cruz	2015	Targeted Delivery of Cytochrome c-based Nanoparticles Coated with a Poly(lactic-co-glycolic acid)-Poly(ethylene glycol)-Folate Conjugate to HeLa Cells
Dr.Kai Griebenow	[90] Manoj Saxena	2015	Site specific chemical glycosylation of cytochrome c to enhance its stability for apoptosis induction in cancer cells
Dr.Kai Griebenow	[93] Cindy M. Figueroa	2015	Cytochrome c nanoparticle formulation for specific delivery to cancer cells, Interphex
Dr.Kai Griebenow	[94] Anna M. Molina	2015	Redox-sensitive cross-linking enhances albumin nanoparticle function as delivery sytem for photodynamic cancer therapy

Symposiums, seminars and/or conferences where the research was presented

ACS Sr. Tech (San Juan, PR)

In-situ XAFS Characterization of the Electro-Oxidation Reaction of Ethanol on Pt Nanoparticles Supported on CeO₂ Nanoparticles and Nanorods in a Fuel Cell (Second Author)

Biosynthesis of Gold Nanoparticles using *Obtusiloba* Extract and their Potential Use in Optical Sensing Applications (Second Author)

From Cadmium Water Remediation to Photoelectrochemical Solar Cells using Nanoscale Zerovalent Iron (Second Author)

ECS and SMEQ Joint International Meeting (Cancun, MX)

39th Senior Technical Meeting ACS (Ponce, PR)

International Chemical Congress of Pacific Basin Societies (Hawaii, USA)

ECS and SMEQ Joint International Meeting (Cancun, MX)

International Chemical Congress of Pacific Basin Societies (Hawaii, USA)

ACS Sr. Tech (Ponce, PR)

Cerium oxide as a promoter for the electro-oxidation reaction of ethanol: in situ XAFS characterization of the Pt nanoparticles supported on CeO₂ nanoparticles and nanorods (Second author) *Physica Chemistry Chemical Physics*

EDTA-Ce (III) Modified Pt Vulcan XC – 72 Catalyst Synthesis for Methanol Oxidation in Acid Solution (Second Author), *Electrocatalysis Journal*

	<p>Pt Electrodeposition at Unsupported Electrochemically Reduced Nanographene Oxide for Enhanced Ammonia Oxidation (Second Author) ACS Applied Materials and Interface</p> <p>Vulcan/Pt/Ce catalyst prepared by impregnation using EDTA for Direct Methanol Fuel Cell, Direct Ethanol Fuel Cell, and Polymer electrolyte Membrane Fuel Cells (Second Author) Journal Small Grid and Renewable Energy (SGRE)</p>
ACMT 2015, Gurabo, PR	<p>American Chemical Society Applied Material and Interfaces (Fourth author)</p> <p>Royal Society of Chemistry Journal (First author)</p>
39th Senior Technical Meeting ACS (Ponce, PR)	
International Chemical Congress of Pacific Basin Societies (Hawaii, USA)	
2ndo Congreso Online de Jovenes de Electroquimica	
XVII Encuentro Ibérico de Electroquímica	
ACS Sr. Tech (Oral)	<p>Cerium oxide as a promoter for the electro-oxidation reaction of ethanol: in situ XAFS characterization of the Pt nanoparticles supported on CeO₂ nanoparticles and nanorods Physica Chemistry Chemical Physics</p>
ACS Sr. Tech (Oral)	<p>Highly Organized Nanofiber Formation from Zero Valent Iron Nanoparticles after Cadmium Water Remediation</p>
AAAS (Poster)	<p>Ethylene Glycol Oxidation at Pt/TiO₂/Carbon Hybrid Catalysts Modified Glassy Carbon Electrodes in Alkaline Media</p>
35th Puerto Rico Interdisciplinary Scientific Meeting and 49th ACS Junior Technical Meeting(Cayey, PR)	

29th annual meeting of the AAAS Caribbean Meeting (Caguas, PR)

35th Puerto Rico Interdisciplinary Scientific Meeting and 50th ACS Junior Technical Meeting(San Juan, PR)

30th annual meeting of the AAAS Caribbean Meeting (San Juan, PR)

32nd Puerto Rico Interdisciplinary Scientific Meeting
(Bayamon, Puerto Rico)

33rd Puerto Rico Interdisciplinary Scientific Meeting (Carolina,
Puerto Rico)

34th Puerto Rico Interdisciplinary Scientific Meeting (Gurabo,
Puerto Rico)

36th Puerto Rico Interdisciplinary Scientific Meeting (San Juan,
Puerto Rico)

XI International Scientific Research Congress (XI CIC) (Santo Domingo, Dominican Republic)

Junior Technical Meeting (JTM) and the Puerto Rico Interdisciplinary Scientific Meeting 2015

Nanotech France 2015

13th Annual Best Practices Conference on Teaching and Learning

International Global Atmospheric Chemistry Conference (Natal, Brazil)

Do cloud properties in a Puerto Rican tropical montane cloud forest depend on occurrence of long-range transported African dust? (Fifth Author, Pure and Applied Geophysics)

American Meteorological Society's Eighth Symposium on Aerosol–Cloud–Climate Interactions (New Orleans, LA)

Impact of Long-Range Transported African Dust on Cloud Water Chemistry at a Tropical Montane Cloud Forest in Northeastern Puerto Rico (First Author, Aerosol and Air Quality Research)

Puerto Rico Louis Stokes' AMP Junior Technical Meeting (San Juan, PR)

Biosynthesis of Gold Nanoparticles using *Osmundaria obtusiloba* Extract and their Potential use in Optical Sensing Applications (First author) Austin Journal of Biosensors and Bioelectronics, 2015

Demineralization of *Sargassum* spp. macroalgae biomass: selective hydrothermal liquefaction process for bio-oil production (First author) Frontiers in Energy Research, 2015

5th International Conference on Algal Biomass, Biofuels and Bioproducts (San Diego, CA)

50th ACS Junior Technical Meeting/35th Puerto Rico Interdisciplinary Scientific Meeting (San Juan, PR)

30th Annual Conference AAAS-PR. Attaining Sustainability Through Science and Education (San Juan, PR)

4th Congreso Estudiantil de Investigación Graduada (San Juan, PR)

13th Annual Best Practice Conference on Teaching and Learning (Gurabo, PR)

Catalytic effect of ultrananocrystalline Fe_3O_4 on algal bio-crude production via HTL process (First author) Nanoscale, 2015

Oral Presentation. 29th Annual Conference AAAS-PR. Harvesting the Ocean for Biologically Active Compounds (Gurabo, PR)

XV Latin American Congress of Chromatography (Cartagena, Col)

4th International Conference on Biomass, Biofuels and Bioproducts (Santa Fe, NM)

Casa abierta programas graduados UPRRPn (San Juan, PR)

Casa abierta programas graduados UPRRPn (San Juan, PR)

NSF PREM Annual Meeting. Washington DC

NSF-PREM 8th Symposium: "Shape, Deformation, and Interaction Effects in Functional Soft Matter", UPR – Humacao, May 2014

11th Annual NSF-PREM Meeting, Palmas del Mar, Humacao PR

AAAS 2015 Annual Meeting. San Jose Convention Center, San Jose CA

J. Phys. Chem. A 2015 Vol: 119 pp 8476-8487

IMRC (International Material Research Congress), Cancun, Mexico

Semana de la Biociencia, UPR-RP, Puerto Rico

Pacificchem, Honolulu, Hawaii

Molybdocene dichloride intercalation into zirconium phosphate nanoparticles,
ACS Joint SERMACS-SWR Regional Meeting, Memphis, Tennessee
Journal of Organometallic Chemistry, 2015, 791, 34-40
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Organic-Inorganic Materials, Brunet, E, Colón, J. L., Clearfield, A. Eds., Wiley:
The American Association for the Advancement of Science (AAAS) Hoboken, 2015

CCI 2015 Annual Retreat, Los Angeles, CA, USA

Let me grow!, Current, 2015, 29 (2)

115th General Meeting: American Society for Microbiology, May 30-June 2 2015, New Orleans, Louisiana

35th Annual Research and Education Forum, March 25-27, 2015, University of Puerto Rico, Medical Science Campus

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Figueroa CM, Morales-Cruz M, Suárez BN, Molina AM, Fernández JC, Quiñones CM, Griebenow K (2015) Induction of cancer cell death by hyaluronic acid-mediated uptake of cytochrome c. *J. Nanomed. Nanotech.* **6**: 316

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Moraima Morales-Cruz, José Hernández-Román, Glinda Hernández, Kai Griebenow (2015) Development of HAMLET-like Cytochrome c-Oleic Acid Nanoparticles for Cancer Therapy, *J. Nanomed. Nanotechnol.* **6(4)**:

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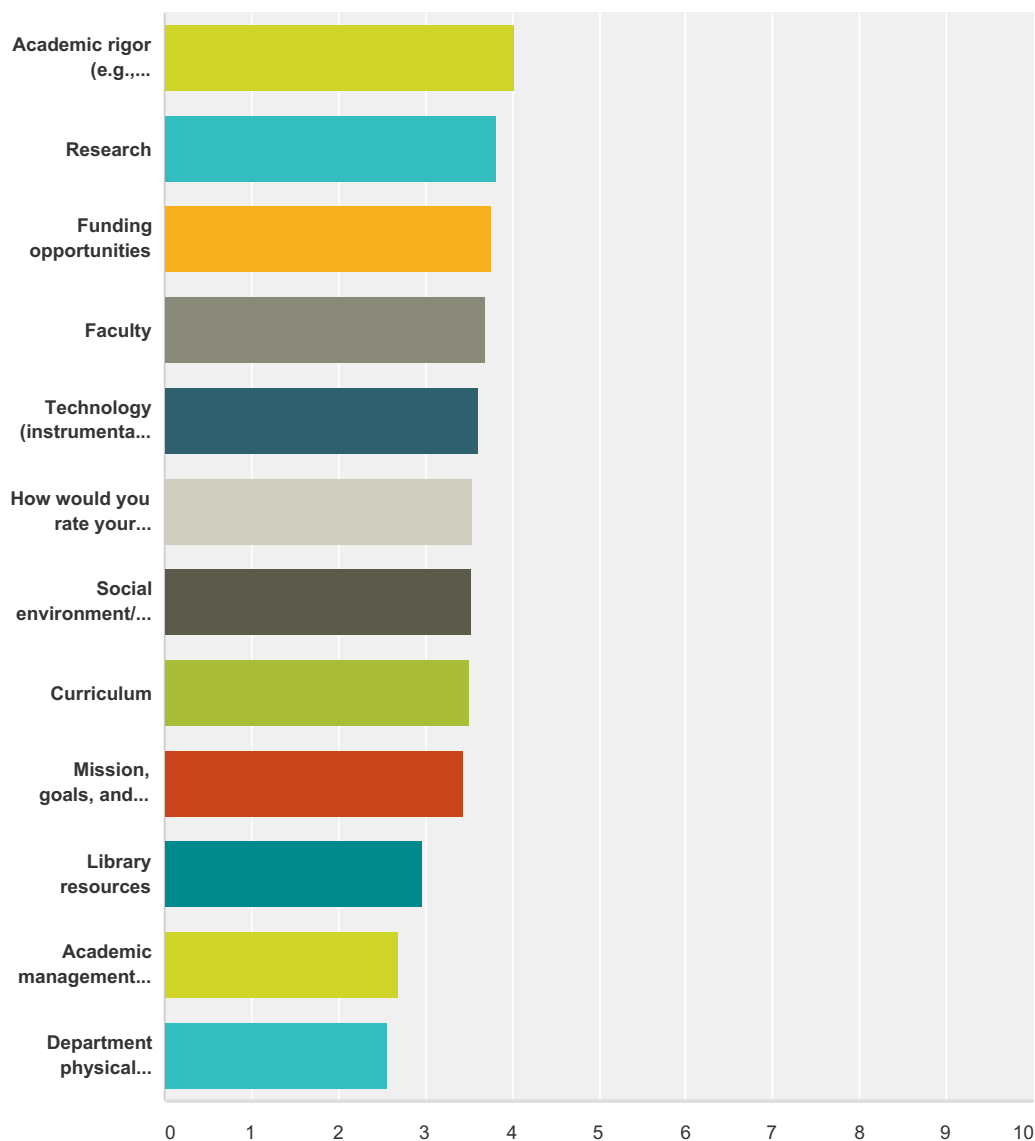
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Appendix 2

Q1 General impression of the program

Answered: 33 Skipped: 0



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Academic rigor (e.g., intellectually challenging)	0.00% 0	3.03% 1	24.24% 8	39.39% 13	33.33% 11	33	4.03
Research	0.00% 0	9.09% 3	15.15% 5	60.61% 20	15.15% 5	33	3.82
Funding opportunities	3.03% 1	12.12% 4	24.24% 8	27.27% 9	33.33% 11	33	3.76
Faculty	0.00% 0	9.38% 3	31.25% 10	40.63% 13	18.75% 6	32	3.69
Technology (instrumentation, IT, network)	3.03% 1	12.12% 4	27.27% 9	36.36% 12	21.21% 7	33	3.61

How would you rate your overall graduate experience?	3.23% 1	6.45% 2	29.03% 9	54.84% 17	6.45% 2	31	3.55
Social environment/Peer group support	3.13% 1	15.63% 5	25.00% 8	37.50% 12	18.75% 6	32	3.53
Curriculum	0.00% 0	9.38% 3	31.25% 10	59.38% 19	0.00% 0	32	3.50
Mission, goals, and objectives	3.13% 1	18.75% 6	12.50% 4	62.50% 20	3.13% 1	32	3.44
Library resources	21.21% 7	21.21% 7	12.12% 4	30.30% 10	15.15% 5	33	2.97
Academic management (coordination, student orientation, web site, etc.)	6.06% 2	39.39% 13	33.33% 11	21.21% 7	0.00% 0	33	2.70
Department physical installations/Research facilities	18.75% 6	31.25% 10	28.13% 9	18.75% 6	3.13% 1	32	2.56

#	Comments for "How would you rate your overall graduate experience?"	Date
1	I am not sure. I guess the level of satisfaction depends on the individual. Also, I did not feel ready to transition from grad school to a real job.	1/21/2016 6:07 PM
2	They have to improve: the purchases order system in order to receive the items or chemicals on time, research projects (some mentors have projects that are too ambitious), accesibility to run samples in special instruments (such as HPLC, GC-MS, NMR, etc)	1/20/2016 1:06 PM
3	More supervision from committe members in terms of student progress and the time taken to reach that progress.	1/19/2016 2:57 PM
4	Se debe disminuir el tiempo promedio de graduacion	1/19/2016 2:02 PM
5	I believe that the morale was always down. Also infrastructure was not very good.	12/9/2015 1:48 PM
6	Lack of control over the time students take in completing the degree.	12/3/2015 5:38 PM
7	The program should focus on reducing graduation time (MS and PhD). In addition, it should focus on preparing students not only to work in universities but in all possible careers (e.g. Industry, Government, consulting, etc.).	12/1/2015 5:50 PM
8	I learned a lot, but there is not a clear focus on what to do to graduate. The timetable varies significantly between professors.	11/27/2015 6:29 PM
9	Just a few professors supported the students in their presentations and seminars. Professors should attend seminars not only to evaluate but to also recommend and encourage students.	11/26/2015 2:08 AM
#	Comments for "Mission, goals, and objectives"	Date
1	Desconozco las metas del programa graduado. Cada laboratorio tiene sus intereses particulares y se ve poco trabajo en equipo. Se necesita más colaboración entre profesores y especializarse en ciertas áreas de investigación para destacarse.	1/19/2016 2:02 PM
2	Strict deadlines will help students reach their deadlines, and in turn will help them graduate in time.	12/9/2015 3:48 PM
3	I have no idea what are the mission, goals and objectives.	12/3/2015 5:38 PM
4	Infrastructure in Facundo Bueso should improve, however, it is understandable due to budget limitations.	11/26/2015 2:08 AM
#	Comments for "Curriculum"	Date
1	Too many courses and seminars!	1/20/2016 1:06 PM
2	Curriculum limited, I suggest more courses related to new technology and research areas.	12/11/2015 2:33 PM
3	Too many classes with no specialization whatsoever.	12/9/2015 1:48 PM
4	Not enough variety of elective courses. Could collaborate with other universities to give online or remote classes.	12/3/2015 5:38 PM
5	Students should have more options for elective courses.	12/1/2015 5:50 PM
6	It need to be improved to the current advances not only in all the areas of Chemistry and Research, but also in the use of equipment (good use) and new tendencies in the Pharmaceutical area.	11/27/2015 11:15 PM

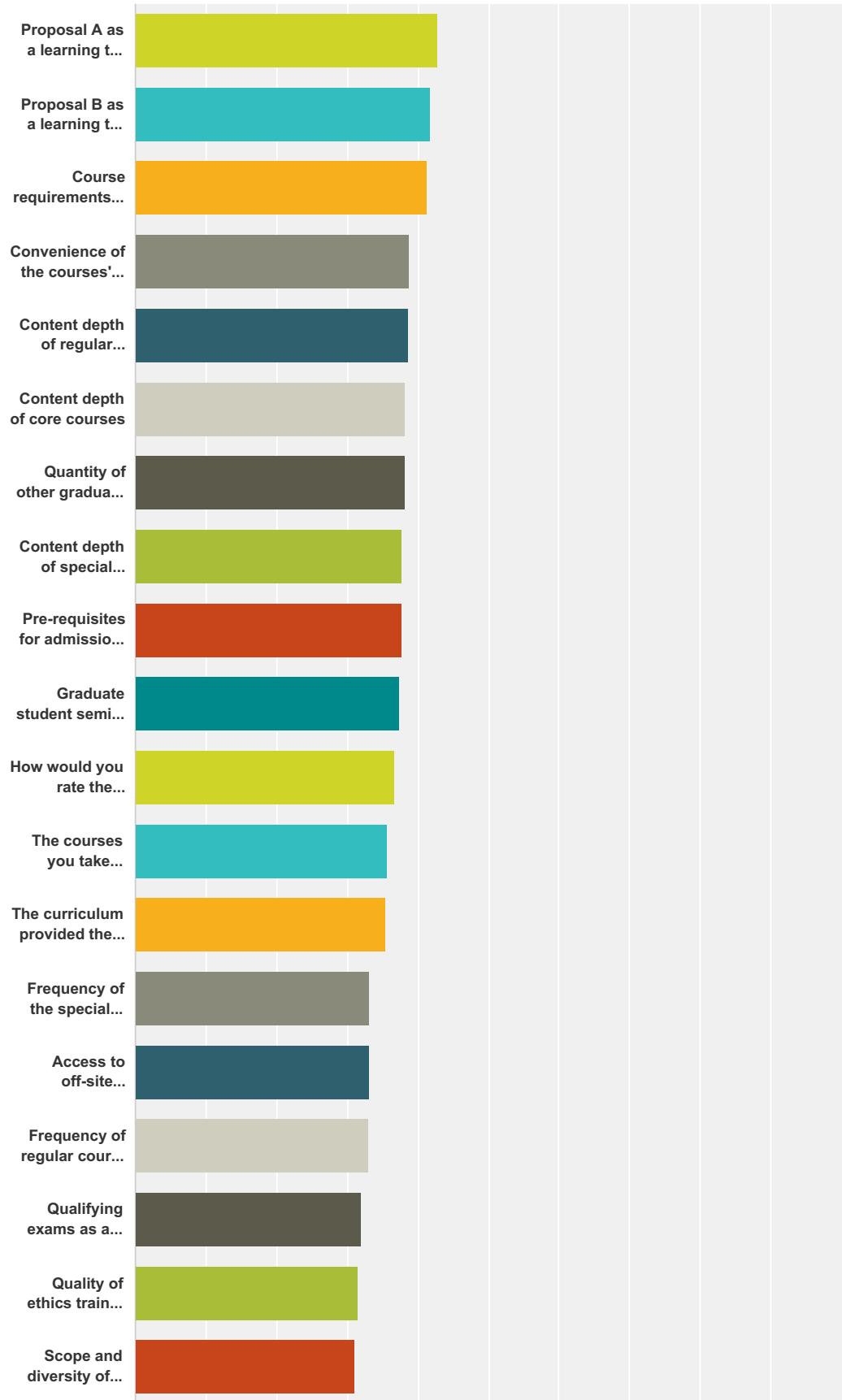
7	Classes should be rated by the students in order to obtain feedback to improve courses. Core courses are not challenging enough and should cover topics that are not covered in the undergraduate courses to improve a deeper knowledge.	11/26/2015 2:08 AM
#	Comments for "Research"	Date
1	We are trying to do first class research in a third world like facilities. There are no consequences for research advisors who keep students for more than a decade working for free.	1/19/2016 2:57 PM
2	Seria mucho pedir que los reactivos lleguen a la semana de pedirlos? aveces hay que esperar hasta 3 meses!	1/19/2016 2:02 PM
3	Research areas are limited also	12/11/2015 2:33 PM
4	We ran into financial trouble which caused us to be without solvents, instruments, liquid nitrogen, etc., which resulted in a hindrance of our research progress.	12/9/2015 3:48 PM
5	From the reserch standpoint I was satisfied.	12/9/2015 1:48 PM
6	Depends on the professor and his or her funding.	12/3/2015 5:38 PM
7	The program is very good about research topics and instruments available.	12/1/2015 5:50 PM
8	Professors should teach students how to write papers and how to design research experiments.	11/26/2015 2:08 AM
#	Comments for "Faculty"	Date
1	The faculty is good, but they tend to keep students for too long. This is abusive.	1/19/2016 2:57 PM
2	Es mucho pedir que los profesores esten en sus laboratorios? Realmente piensan que los laboratorios corren solo y esperan que los estudiantes los llamen. Deberian ponerle un ponchador!	1/19/2016 2:02 PM
3	There were some Professors that they were be best at the teaching level instead of research.	12/9/2015 1:48 PM
4	Needs more variety.	12/3/2015 5:38 PM
5	Researchers are always working in areas of research that are important globally. Is a good idea that the faculty start	12/1/2015 5:50 PM
6	Some professors are very good, but courses should be rated by the students at the end so that professors can improve their classes. There are many professors that have great opportunities to improve.	11/26/2015 2:08 AM
#	Comments for "Academic rigor (e.g., intellectually challenging)"	Date
1	Questionable. I met several students that were not doctoral candidates material and yet professors passed them.	12/3/2015 5:38 PM
2	I understand that each advisor had their rules to graduate students. But the program need to be more aware that sometimes in some cases Ph.D. students obtain their degree with submitted papers that later was rejected, or stay in submitted status for year. Some of us, our advisors dont let us defend Thesis without at least one paper published. The rule need to be very clear, and in justice for all graduate studentes.	11/27/2015 11:15 PM
3	It is not challenging. In research, it depends on the mentors, but the courses are not challenging, at least when I was there.	11/26/2015 2:08 AM
#	Comments for "Library resources"	Date
1	Many time is difficult to find access to some journals.	1/20/2016 1:06 PM
2	Can be improved to have unlimited access to research articles electronically	1/19/2016 5:16 PM
3	deberian monitorear las revistas de mas uso y pagar esas (aunque sean mas costosas) y las de menos uso hacer acuerdos interbibliotecarios	1/19/2016 2:02 PM
4	deberia haber mas acceso por internet porque ir a la biblioteca consume demasiado tiempo en comparacion a buscarlo en linea.	12/22/2015 1:17 PM
5	full access to journals	12/11/2015 2:33 PM
6	The library is too far from Facundo Bueso.	12/9/2015 5:58 PM
7	This has to change if you want a good grad school.	12/9/2015 1:48 PM
8	Could improve.	12/3/2015 5:38 PM
9	The access to actual scientific literature was very limited, when articles were available online up to a year prior to get the printed version at the library...	11/30/2015 1:20 PM

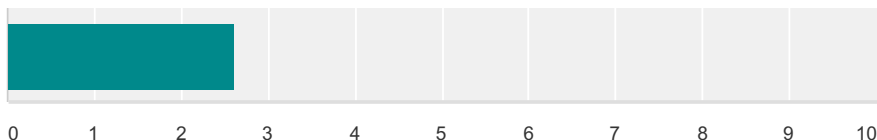
10	Library resources are excellent, may be more Journal titles available, but librarians are excellent on searching articles that are not available in our data base (Prestamos interbibliotecarios). Students, in general, need to know more about their services. In my case, I use every services available from the library, journals, equipments, study rooms, copy, etc.	11/27/2015 11:15 PM
11	Hardly access to many of the important research journals. I often needed to ask friends in other institutions for articles. We need continued access to the major journals.	11/27/2015 6:29 PM
12	The fact that students can access papers from UPR-RCM through proxy is really good. UPR-RCM has access to many journals that are not open to UPR-RP. However, the journals in UPR-M should also be open to all students of the UPR system.	11/26/2015 2:08 AM
#	Comments for "Department physical installations/Research facilities"	Date
1	The building is old.	1/21/2016 6:07 PM
2	This is the area which I was dissatisfied. The facilities were not at the level expected for an installation where advance investigations were performed. The department must ensure the University commit resources to improve and maintain physical plants	1/19/2016 5:16 PM
3	No dry ice, no nitrogen, no NMR working, no reactives...	1/19/2016 2:57 PM
4	Llueve en el primer y segundo piso! si abres algunas duchas de emergencia dañarás varios equipos. Es más fácil y barato construir otro edificio. (Aunque construyeron el molecular y el programa graduado de química esta mas fragmentado....) Deberían estar en el mismo edificio.	1/19/2016 2:02 PM
5	Creo que las instalaciones deberian revisarse ya que el edificio es demasiado viejo y por consiguiente la estructura está deteriorada.	12/22/2015 1:17 PM
6	Facundo Bueso is too old. I finished my PhD before the new building was done, so I can't have an opinion about that facility. Still I believe that the location of the new building is not convenient.	12/9/2015 5:58 PM
7	Bad	12/9/2015 1:48 PM
8	During my time, the only building available was Facundo Bueso and the conditions very very bad. From lack of air conditioner to condensation on the walls to not enough space.	12/3/2015 5:38 PM
9	The department physical installations can be improved. It is necessary more than one classroom and in better condition. In general, research facilities have room to improve but are ok.	12/1/2015 5:50 PM
10	Installations and equipment need regular maintenance. For example, equipments like, NMR's, GC-MS's, etc., need services contract and maintenance. Laboratories and the building really need maintenance, in the general services, light, water, air conditioner, etc. Some areas are not secure for students or people.	11/27/2015 11:15 PM
11	Facundo Bueso needs much improvement, however, the new building is state-of-the-art.	11/26/2015 2:08 AM
#	Comments for "Technology (instrumentation, IT, network)"	Date
1	Improve maintenance of equipment.	1/19/2016 5:16 PM
2	Tenemos buenos instrumentos, pero pertenecen a distintas tribus en diferentes edificio lo que hace que se gaste dinero en duplicar instrumentos	1/19/2016 2:02 PM
3	Tenemos buena instrumentación, aunque se podría añadir alguna otra, pero la universidad falla en pagar los contratos por servicio a las compañías y eso dificulta arreglar algún instrumento cuando se rompe.	12/22/2015 1:17 PM
4	So limited	12/11/2015 2:33 PM
5	By the time that I was doing my research the instrumentation was good, but the University can do better.	12/9/2015 5:58 PM
6	Always a challenge. Instruments are managed by certain people that they basically colonize the time on the instruments. One example of this is the Nanoscopy facility. During my term, my TEM measurements were performed abroad because having the person run the samples was nearly impossible. I	12/9/2015 1:48 PM
7	Internet failed at times. Power shortages damaged equipment.	12/3/2015 5:38 PM
8	More computer and printer for students.	12/1/2015 5:50 PM
9	With a good maintenance of the equipment, instrumentation, students will be able to use them. We all, needed to be exposed to different instrumentation. A general course on different instrumentation techniques, not only for a research area, but more for general knowledge will be very useful.	11/27/2015 11:15 PM
10	Instrumentation can be better, or more collaborative, but overall I was very satisfied starting from the moment that the new building was open.	11/26/2015 2:08 AM

#	Comments for "Academic management (coordination, student orientation, web site, etc.)"	Date
1	better website and online tools.	1/21/2016 6:07 PM
2	This needs serious help, but the help should be directed to the professors attitude toward the student.	1/19/2016 2:57 PM
3	los comite de tesis deberian darle seguimiento al progreso de los estudiantes	1/19/2016 2:02 PM
4	In my experience, in my last couple of years, the coordination was improving. My student orientation was good because AGEP program was involve on that, I don't how was after that. The web site wasn't updated frequently.	12/9/2015 5:58 PM
5	You're stuck if you don't speak Spanish. There was always a communication gap because of this language barrier. Good thing was that there was always someone to help with translation.	12/9/2015 3:48 PM
6	I think that graduate students need strong support and a clear orientation in at least the first two years. The thesis committee needs to mentoring more the student as well as the thesis advisor.	12/9/2015 12:11 PM
7	Beyond first year TA training there is not much orientation. The website was not useful	12/3/2015 5:38 PM
8	Coordination, orientation, and the web site need an urgent update. The department need people that want to growth and update the research to new techniques, and also with an open mind to make changes and accept changes. Web site need to reflect the new areas, recent papers and the achievements of the program. Graduate Students need orientation, and advise. Not all of us want to continue in the academia, some of us want to go to the Industry, and the Program, in general, prepare students to continue in the Academia, but not to go to the Pharmaceutical Industry	11/27/2015 11:15 PM
9	It's outdated, we often did not know what to do next. You should identify if students are interested in working in industry or going to academia, offer help in how to achieve those specific goals keeping the timeframe in mind.	11/27/2015 6:29 PM
10	It is ok.	11/26/2015 2:08 AM
#	Comments for "Social environment/Peer group support"	Date
1	The thesis comitte has to meet with the student more often.	1/20/2016 1:06 PM
2	Create a support group with the engagement of faculty.	1/19/2016 5:16 PM
3	In my year was very good but not always is this way.	12/1/2015 5:50 PM
#	Comments for "Funding opportunities"	Date
1	It is very unfortunate that the funds/grants have names before the student even applies.	1/19/2016 2:57 PM
2	I was in a good position in the area of funding opportunities because of the focus of my research. I have many graduate student friends that weren't that fortunate.	12/9/2015 5:58 PM
3	I always had financial support during my graduate study.	12/9/2015 3:48 PM
4	As a student as first finish a Master Degree and then a Ph.D., Master student have a lack of funding opportunities. We are, as good as any Ph.D. student on the program, and some of us work more than many Ph.D. student to obtain a Master, but without funding. Only few grants are available for Master students, if not they are Teaching Assistants. Also, there are only few grants available for students, and we really compete for them. We wait patiently for a space on them to apply. Opportunities, sometimes, are limited.	11/27/2015 11:15 PM

Q2 Course Overall Experience

Answered: 28 Skipped: 5



The courses
you take...

	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Proposal A as a learning tool to facilitate the organization and planning of your thesis project	0.00% 0	3.57% 1	10.71% 3	39.29% 11	46.43% 13	28	4.29
Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for your professional career	0.00% 0	3.57% 1	14.29% 4	42.86% 12	39.29% 11	28	4.18
Course requirements to complete degree (number of credits required)	0.00% 0	0.00% 0	10.71% 3	64.29% 18	25.00% 7	28	4.14
Convenience of the courses' time schedule	0.00% 0	10.71% 3	14.29% 4	50.00% 14	25.00% 7	28	3.89
Content depth of regular graduate courses offered after the core courses	0.00% 0	7.14% 2	17.86% 5	57.14% 16	17.86% 5	28	3.86
Content depth of core courses	3.57% 1	14.29% 4	7.14% 2	46.43% 13	28.57% 8	28	3.82
Quantity of other graduate program degree requirements	3.57% 1	0.00% 0	21.43% 6	60.71% 17	14.29% 4	28	3.82
Content depth of special topics' courses offered after the core courses	3.70% 1	11.11% 3	14.81% 4	44.44% 12	25.93% 7	27	3.78
Pre-requisites for admission (are they enough?)	0.00% 0	11.11% 3	22.22% 6	44.44% 12	22.22% 6	27	3.78
Graduate student seminar as a learning tool for problem solving and to conduct independent studies	3.70% 1	11.11% 3	14.81% 4	48.15% 13	22.22% 6	27	3.74
How would you rate the graduate curriculum and curricular experience?	0.00% 0	7.14% 2	25.00% 7	60.71% 17	7.14% 2	28	3.68
The courses you take prepare you with the necessary skills and knowledge to successfully carry out graduate level research	3.57% 1	14.29% 4	21.43% 6	42.86% 12	17.86% 5	28	3.57
The curriculum provided the skills and knowledge needed to succeed in your career	3.57% 1	7.14% 2	32.14% 9	46.43% 13	10.71% 3	28	3.54
Frequency of the special topic's courses offered after the core courses	3.57% 1	25.00% 7	21.43% 6	35.71% 10	14.29% 4	28	3.32
Access to off-site internships and locations for collaborative research opportunities	10.71% 3	14.29% 4	25.00% 7	32.14% 9	17.86% 5	28	3.32
Frequency of regular courses offered after the core courses	3.57% 1	25.00% 7	21.43% 6	39.29% 11	10.71% 3	28	3.29
Qualifying exams as a measure of the capacity of the student to pursue graduate studies at the doctoral and masters levels.	11.11% 3	22.22% 6	14.81% 4	40.74% 11	11.11% 3	27	3.19
Quality of ethics training related to chemical research as incorporated in curriculum or in orientation	14.81% 4	18.52% 5	18.52% 5	33.33% 9	14.81% 4	27	3.15
Scope and diversity of graduate courses in the program	0.00% 0	37.04% 10	22.22% 6	33.33% 9	7.41% 2	27	3.11
The courses you take prepare you for writing the thesis	17.86% 5	35.71% 10	17.86% 5	25.00% 7	3.57% 1	28	2.61

#	Comments for "How would you rate the graduate curriculum and curricular experience?"	Date
1	Too many classes	12/9/2015 1:57 PM
2	Very much depends on the student's interest in self-learning	12/3/2015 5:49 PM
3	I took courses that I think were necessary for my research area, or for my future. But not all semesters good courses are available, or interesting.	11/27/2015 11:15 PM
#	Comments for "The curriculum provided the skills and knowledge needed to succeed in your career"	Date
1	deberian enfocarse en el mercado laboral y honestamente no veo mucha interaccion con la industria	1/19/2016 2:14 PM
2	It provided some. But most of my success has been due to autostudy	12/9/2015 1:57 PM
3	Courses need to be directed by needed to research area, and knowledge for the future. I think, at least one time a year, a special topic courses about Pharmaceutical industry, instrumental/equipment techniques need to be offer. I think I have the knowledge to succeed, or at least I know where to search for it, but sometimes reading is not enough and training is necessary.	11/27/2015 11:15 PM
4	The courses almost never cover the skills and knowledge needed. The research is the important part of the Ph.D.	11/26/2015 2:19 AM
#	Comments for "The courses you take prepare you with the necessary skills and knowledge to successfully carry out graduate level research"	Date
1	Include in the courses examples with real laboratory experiences.	1/20/2016 1:21 PM
2	I took all the courses (special topics) that I thought that were necessary for my research. More courses that required by department.	11/27/2015 11:15 PM
#	Comments for "The courses you take prepare you for writing the thesis"	Date
1	Offer seminars specific for thesis writing skills.	1/20/2016 1:21 PM
2	Deberian incluir, si ya no lo han hecho, un curso para preparar tesis, propuestas, artículos, etc	12/22/2015 1:25 PM
3	No, no, no	12/9/2015 1:57 PM
4	Not at all.	12/3/2015 5:49 PM
5	No courses prepare you to write a thesis.	11/27/2015 6:36 PM
#	Comments for "Scope and diversity of graduate courses in the program"	Date
1	I believe it can be improved, perhaps by incorporating biotech courses, biology and medical	1/19/2016 5:30 PM
2	The courses were too diverse that they were most of the time out of my area of interest. I guess they were interesting for other people. At least the courses that I took were good enough for my thesis and for the kind of job that I have right now.	12/9/2015 6:27 PM
3	No diversity at all	12/9/2015 1:57 PM
#	Comments for "Content depth of core courses"	Date
1	Core courses were more a step into getting the candidacy.	12/9/2015 1:57 PM
2	Depends on the professor. They do not follow a standard curriculum. Each professor teaches whatever they want to teach.	12/3/2015 5:49 PM
3	The content varies depending on who's teaching the course. They need to be uniform.	11/27/2015 6:36 PM
#	Comments for "Content depth of regular graduate courses offered after the core courses"	Date
1	It depends heavily on each professor. There are many very good, and many very bad.	11/26/2015 2:19 AM
#	Comments for "Frequency of regular courses offered after the core courses"	Date
1	Is not bad idea to increase frequency.	1/19/2016 5:30 PM
#	Comments for "Content depth of special topics' courses offered after the core courses"	Date
1	These were the best courses.	12/3/2015 5:49 PM
2	Some courses, in special topic, need to be more depth in some areas.	11/27/2015 11:15 PM
#	Comments for "Frequency of the special topic's courses offered after the core courses"	Date
1	Maybe in some areas needed to wait to a good amount of student to teach some courses. But in areas like Organic Chem, more special topic courses are needed.	11/27/2015 11:15 PM

2	They really do not help for the research since they are based on old books and do not teach what is needed for cutting edge research.	11/26/2015 2:19 AM
#	Comments for "Quality of ethics training related to chemical research as incorporated in curriculum or in orientation"	Date
1	No recuerdo haberlo tenido mientras estuve en Facundo Bueso, pero deberían incluir cursos de ética. Muchas veces hacemos y tomamos decisiones y no necesariamente estamos conscientes del aspecto ético.	12/22/2015 1:25 PM
2	None. I witnessed plagiarism from one student using a post doc to write her proposal B for her. I told my PI and nothing was done.	12/3/2015 5:49 PM
3	There was no ethics training.	11/27/2015 6:36 PM
4	Never had that in my courses.	11/26/2015 2:19 AM
#	Comments for "Access to off-site internships and locations for collaborative research opportunities"	Date
1	Your research advisor will discourage you from doing this because you have work to do in the lab for him and not for others.	1/19/2016 3:08 PM
2	Depends on the PI. Not support from the department.	12/3/2015 5:49 PM
3	Only opportunities for Universities and NASA. Other opportunities for internship in Industry, national labs and outside US are necessary.	12/2/2015 10:13 AM
4	These experiences are not public knowledge.	11/27/2015 6:36 PM
#	Comments for "Course requirements to complete degree (number of credits required)"	Date
1	May be too much credits.	11/27/2015 11:15 PM
#	Comments for "Quantity of other graduate program degree requirements"	Date
1	Other Universities have less quantities of requirements leaving more time to do research and be able to finish in 4 to 5 years.	12/9/2015 6:27 PM
2	Too many requirements. Prop A, Seminar, Core courses, Qualifying, Proposal B, Thesis. Are we preparing professionals to succeed in a research career?	12/9/2015 1:57 PM
#	Comments for "Pre-requisites for admission (are they enough?) "	Date
1	I consider that an interview of students will be a plus for the program.	1/20/2016 1:21 PM
2	Not rigorous enough.	12/3/2015 5:49 PM
#	Comments for "Convenience of the courses' time schedule"	Date
1	This must be changed to accommodate courses at other hours. I know that TA prohibits this, but a solution must be found.	12/9/2015 1:57 PM
#	Comments for "Qualifying exams as a measure of the capacity of the student to pursue graduate studies at the doctoral and masters levels."	Date
1	I don't know, but I think it should not be the only measurement for qualify a student as doctoral or masters level.	1/20/2016 1:21 PM
2	los exámenes deben estar mejor coordinados. se notan que los profesores no se sientan a planificar el examen y cada cual manda lo que le parece.	1/19/2016 2:14 PM
3	Los exámenes no necesariamente dictan la capacidad de un estudiante para ir o no al doctorado. Hay otros aspectos como iniciativa, responsabilidad que no se miden con un examen.	12/22/2015 1:25 PM
4	The problem was not the exams themselves, but the irregularities seen in their implementation, such as students that did not fulfill the requirements to take the tests yet were allowed to take them. Such unethical and unfair allowances cannot be permitted if the program is to be taken seriously and considered competitive.	12/9/2015 7:10 PM
5	This doesn't measure anything. This is a pre-historic requisite.	12/9/2015 1:57 PM
6	I suggest oral examinations.	12/3/2015 5:49 PM
7	Para la gran mayoría de estos cursos del primer año deben mejorarse los objetivos del curso y por lo tanto el examen calificativo. El examen no debe depender del profesor que impartió el curso sino de los objetivos del curso. El examen debe medir el conocimiento aprendido del estudiante, el pensamiento crítico del estudiante, y la capacidad del estudiante para utilizar este conocimiento y resolver problemas relacionados.	11/30/2015 4:02 PM
8	In some courses measure the capacity and challenge the knowledge of the student. In others is just a list of "definitions" that you learn for the exam and paste on it, without challenging the knowledge.	11/27/2015 11:15 PM

#	Comments for "Graduate student seminar as a learning tool for problem solving and to conduct independent studies"	Date
1	I learned a lot during the preparation of the Graduate Seminar, but I think the proposal B is just enough for that. I prefer that that time is used for research.	12/9/2015 6:27 PM
2	I think is a good practice for the student. But again it takes too much time from the student research project.	12/9/2015 1:57 PM
3	Professors should support the students more, and they should attend seminars not only to evaluate but to recommend and encourage students.	11/26/2015 2:19 AM
#	Comments for "Proposal A as a learning tool to facilitate the organization and planning of your thesis project"	Date
1	It is a good idea, but in order for it to be effective as a learning tool it must be enforced within the first few years of grad school. Otherwise there is no point since the students learn project organization/planning as years go by in the lab.	12/9/2015 7:10 PM
2	If I were asked what to remain as is.. This is one of the things. This is a good and productive requirement. I would add to proposal A the format requisite in NSF or NIH so that the student doesn't have to present in proposal B	12/9/2015 1:57 PM
#	Comments for "Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for your professional career"	Date
1	The graduate school has to help in this learning process in order to be effective.	1/20/2016 1:21 PM
2	Same as Proposal A, I think this should be completed earlier in the course of the PhD, no later than 3rd year, so that the student can actually use the experience gained from it to write real proposals and planning research.	12/9/2015 7:10 PM
3	I would get rid of this. At least the presentation. The written manuscript is fine. One or the other. I found this useful but it can be eliminated with a course on proposal writing or similar.	12/9/2015 1:57 PM
4	Unless you copy someone else's idea which happens.	12/3/2015 5:49 PM
5	Even though it was a great experience, some students will like to pursue a career outside of the academic world, where that kind of proposal is not a requirement or it is irrelevant to specific industries.	11/30/2015 1:28 PM
6	There should be some seminars to teach students how to write proposals.	11/26/2015 2:19 AM

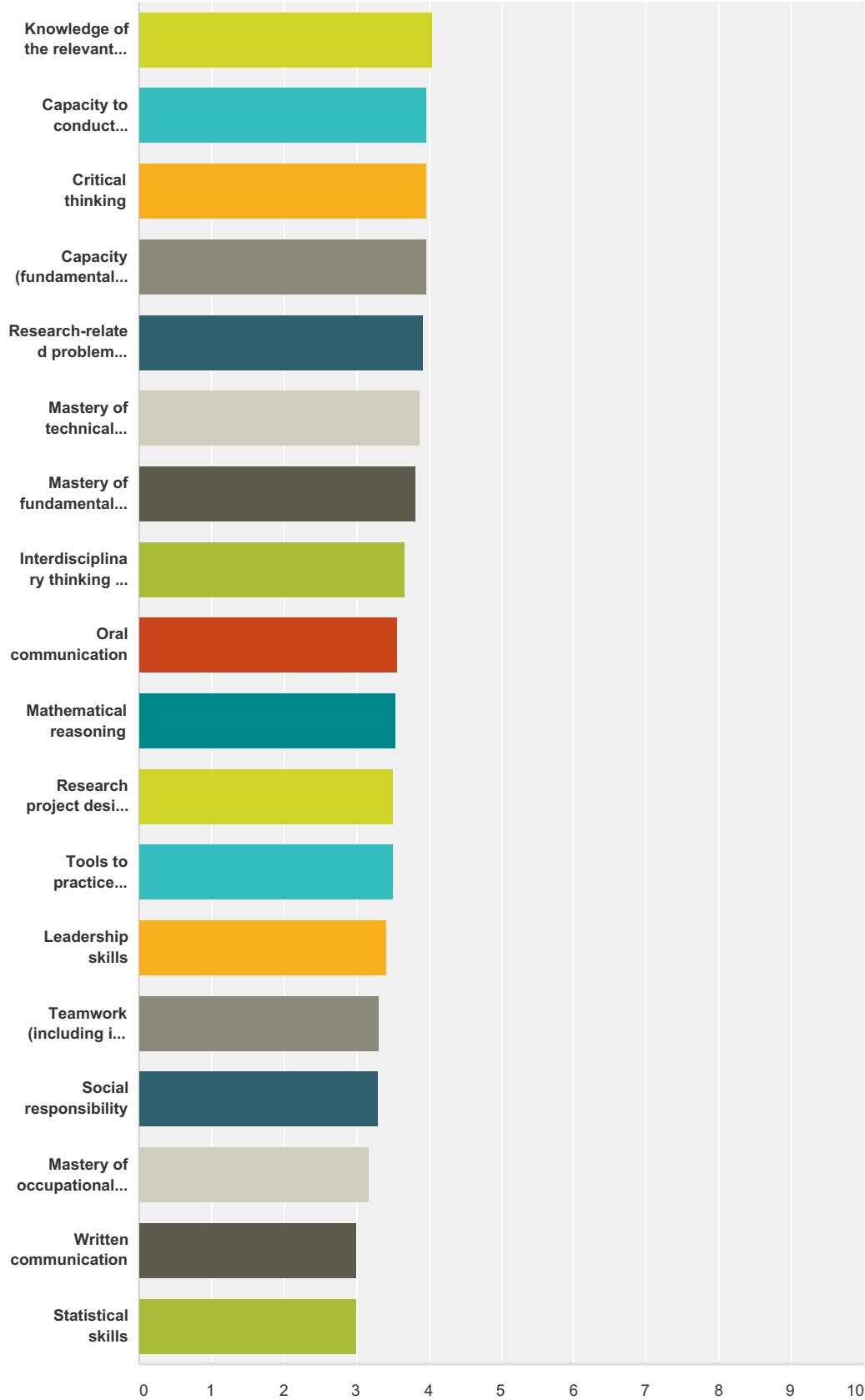
Q3 If you can recommend three to five new courses for the program, what would they be? Explain why and comment, please.

Answered: 14 Skipped: 19

#	Responses	Date
1	Biotechnology	1/20/2016 12:10 PM
2	Courses to foster the critical thinking to provide solutions to problems such as energy, recycling, medical among others.	1/19/2016 5:30 PM
3	Searching/applying for reseach grants.	1/19/2016 3:08 PM
4	internados en industria	1/19/2016 2:14 PM
5	Interdisciplinary courses with biology and physics.	1/19/2016 1:01 PM
6	No comment	12/9/2015 7:10 PM
7	The Chemistry of Multifunctional Materials - This is the future of science. Everything is moving to develop materials that can have more than one functionality at the same time. And it's important to understand the chemistry of it.	12/9/2015 6:27 PM
8	1. Scientific publishing 2. Alternative energy topics - need of the hour	12/9/2015 3:52 PM
9	Bioanalytical Chemsitry Proteomics Microscopy	12/9/2015 1:57 PM
10	Ethics (compulsory). Scientific writing as a workshop for proposal A. Statistics.	12/3/2015 5:49 PM
11	Organometallics Materials Sciences Tribology/Metrology Surface chemistry/phenomena Colloidal Chemistry	11/30/2015 1:28 PM
12	Industrial/pharmaceutical chemistry - for students that want to continue a career in the industry. How to use Pharmacopeias, what is GMP, SOP, etc. General instrumentation techniques - as a lab that students learn the good use of instrumentation, like GC's, HPLC, etc, not all student use them on their research, and some of them will be use them but doesn't know how use it. May be more laboratories techniques for graduate students. The special topic courses are bases in theory but not in practice.	11/27/2015 11:15 PM
13	Scientific misconduct - it should be a mandatory course for all second year students. Scientific writing for English as a second language	11/27/2015 6:36 PM
14	Chemistry of Polymers, Design of Nanomaterials, Bionanomaterials. Courses should be prepared based on hot topics in the last few years, not using books published 10 years ago.	11/26/2015 2:19 AM

Q4 Capacity building: How would you rate the program in terms of your exposure to activities/courses that allow you to develop the following skills?

Answered: 28 Skipped: 5



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
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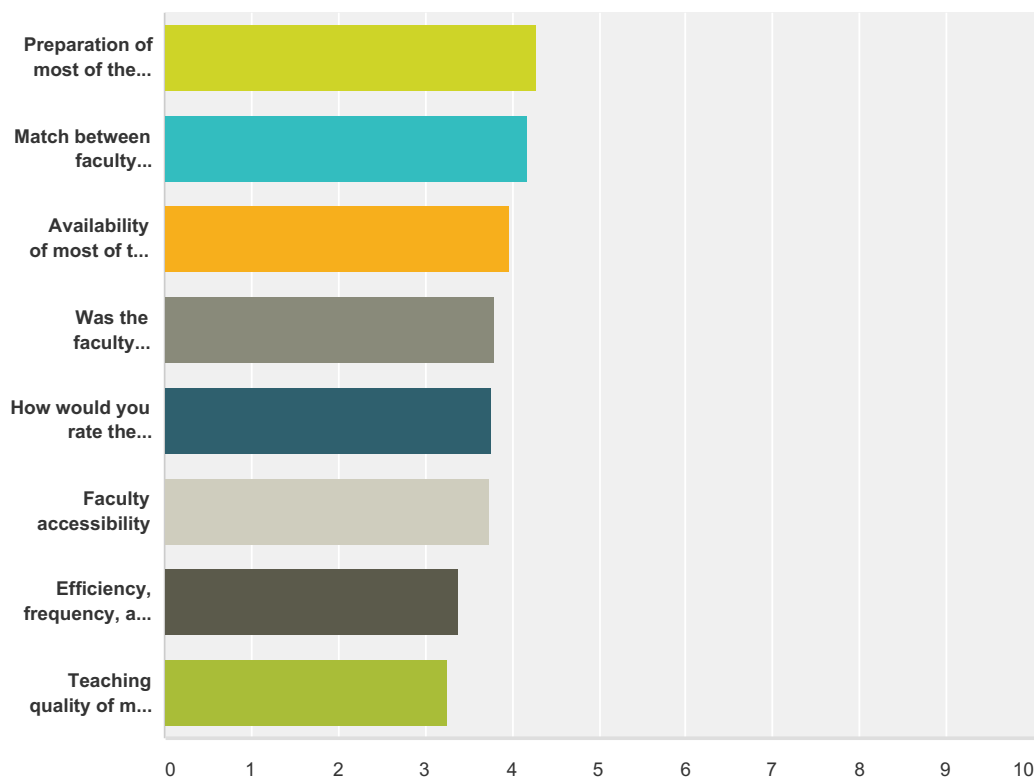
Knowledge of the relevant scientific literature and the ability to use it in problem solving	0.00% 0	7.14% 2	7.14% 2	60.71% 17	25.00% 7	28	4.04
Capacity to conduct independent research	0.00% 0	14.29% 4	3.57% 1	53.57% 15	28.57% 8	28	3.96
Critical thinking	0.00% 0	3.57% 1	21.43% 6	50.00% 14	25.00% 7	28	3.96
Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry	0.00% 0	7.14% 2	7.14% 2	67.86% 19	17.86% 5	28	3.96
Research-related problem solving	0.00% 0	7.14% 2	17.86% 5	50.00% 14	25.00% 7	28	3.93
Mastery of technical skills required for a chemical professional	3.57% 1	0.00% 0	14.29% 4	67.86% 19	14.29% 4	28	3.89
Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines	0.00% 0	3.57% 1	25.00% 7	57.14% 16	14.29% 4	28	3.82
Interdisciplinary thinking and knowledge	3.57% 1	10.71% 3	21.43% 6	42.86% 12	21.43% 6	28	3.68
Oral communication	3.57% 1	7.14% 2	25.00% 7	57.14% 16	7.14% 2	28	3.57
Mathematical reasoning	3.57% 1	14.29% 4	17.86% 5	53.57% 15	10.71% 3	28	3.54
Research project design and development	7.14% 2	3.57% 1	32.14% 9	46.43% 13	10.71% 3	28	3.50
Tools to practice ethical conduct on your professional career	3.57% 1	14.29% 4	25.00% 7	42.86% 12	14.29% 4	28	3.50
Leadership skills	7.14% 2	7.14% 2	35.71% 10	35.71% 10	14.29% 4	28	3.43
Teamwork (including in diversity scenarios)	3.57% 1	21.43% 6	28.57% 8	32.14% 9	14.29% 4	28	3.32
Social responsibility	7.41% 2	14.81% 4	29.63% 8	37.04% 10	11.11% 3	27	3.30
Mastery of occupational safety and security laws, and environmental protection regulations	10.71% 3	21.43% 6	17.86% 5	39.29% 11	10.71% 3	28	3.18
Written communication	10.71% 3	17.86% 5	32.14% 9	39.29% 11	0.00% 0	28	3.00
Statistical skills	14.29% 4	17.86% 5	28.57% 8	32.14% 9	7.14% 2	28	3.00

#	Comments for "Written communication"	Date
1	Maybe some courses can apply this type of communication as an evaluation form like exams.	1/20/2016 1:21 PM
2	No hay cursos y actividades dirigidas que ayuden la comunicación escrita (especialmente en inglés) del estudiante.	11/30/2015 4:02 PM
#	Comments for "Oral communication"	Date
1	Maybe some courses can apply this type of communication such as oral presentations of some theme of the course.	1/20/2016 1:21 PM
#	Comments for "Research project design and development"	Date
	There are no responses.	
#	Comments for "Capacity to conduct independent research"	Date
	There are no responses.	
#	Comments for "Research-related problem solving"	Date

	There are no responses.	
#	Comments for "Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines"	Date
	There are no responses.	
#	Comments for "Teamwork (including in diversity scenarios)"	Date
1	I had just few opportunities for teamwork because the kind of research that I did.	12/9/2015 6:27 PM
#	Comments for "Interdisciplinary thinking and knowledge"	Date
1	Not many opportunities, or it varies between laboratories.	11/27/2015 6:36 PM
#	Comments for "Critical thinking"	Date
	There are no responses.	
#	Comments for "Social responsibility"	Date
	There are no responses.	
#	Comments for "Leadership skills"	Date
	There are no responses.	
#	Comments for "Mathematical reasoning"	Date
	There are no responses.	
#	Comments for "Statistical skills"	Date
	There are no responses.	
#	Comments for "Mastery of occupational safety and security laws, and environmental protection regulations"	Date
1	Our hoods did not work for years, OPASO never did anything. Later we found out that one of the workers had an argument with my research advisor and decided to damage our hoods in purpose. Again OPASO did not care. They only took pictures and disappeared for months.	1/19/2016 3:08 PM
2	The program need more.	1/19/2016 1:01 PM
#	Comments for "Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry"	Date
	There are no responses.	
#	Comments for "Knowledge of the relevant scientific literature and the ability to use it in problem solving"	Date
1	More access to diverse journals	11/27/2015 6:36 PM
#	Comments for "Mastery of technical skills required for a chemical professional"	Date
	There are no responses.	
#	Comments for "Tools to practice ethical conduct on your professional career"	Date
	There are no responses.	

Q5 Part C. (1) Faculty

Answered: 28 Skipped: 5



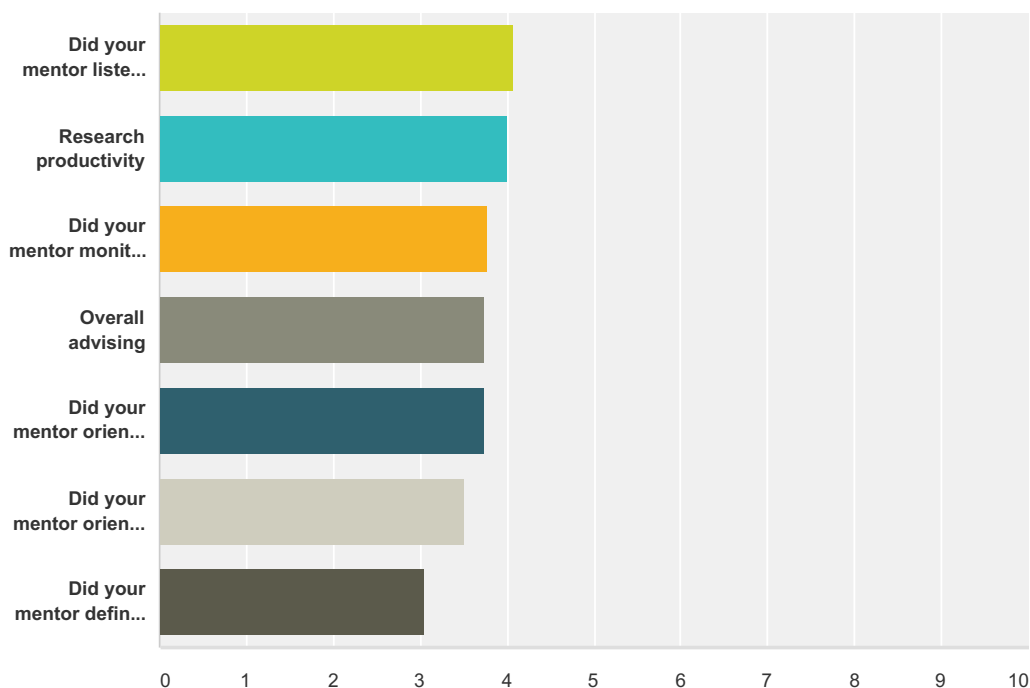
	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Preparation of most of the professors	0.00% 0	3.57% 1	14.29% 4	32.14% 9	50.00% 14	28	4.29
Match between faculty expertise and course offerings	0.00% 0	3.57% 1	10.71% 3	50.00% 14	35.71% 10	28	4.18
Availability of most of the professors to receive students in their office hours	3.57% 1	3.57% 1	14.29% 4	50.00% 14	28.57% 8	28	3.96
Was the faculty sufficiently diverse as to advise students in regard to different research aspects related to their thesis project?	3.57% 1	3.57% 1	28.57% 8	39.29% 11	25.00% 7	28	3.79
How would you rate the graduate faculty overall?	0.00% 0	7.14% 2	21.43% 6	60.71% 17	10.71% 3	28	3.75
Faculty accessibility	7.41% 2	0.00% 0	25.93% 7	44.44% 12	22.22% 6	27	3.74
Efficiency, frequency, and clarity in reporting student's academic progress during the course	3.57% 1	10.71% 3	39.29% 11	35.71% 10	10.71% 3	28	3.39
Teaching quality of most of the professors	3.57% 1	21.43% 6	32.14% 9	32.14% 9	10.71% 3	28	3.25

#	Comments for "How would you rate the graduate faculty overall?"	Date
1	The faculty is well prepared, but they simply don't know how to help students graduate in a reasonable time.	1/19/2016 3:10 PM
2	Most of the professors are excellent and are in pro of student. Others are not interested on the good teaching to the students, and sometimes we learn the hard way to study independently, and without a place to clarify doubts.	11/27/2015 11:15 PM

#	Comments for "Preparation of most of the professors"	Date
	There are no responses.	
#	Comments for "Match between faculty expertise and course offerings"	Date
	There are no responses.	
#	Comments for "Teaching quality of most of the professors"	Date
1	Some professors were not meant to be teachers.	11/27/2015 6:37 PM
#	Comments for "Faculty accessibility"	Date
	There are no responses.	
#	Comments for "Availability of most of the professors to receive students in their office hours"	Date
	There are no responses.	
#	Comments for "Efficiency, frequency, and clarity in reporting student's academic progress during the course"	Date
1	There is simply no follow up.	1/19/2016 3:10 PM
#	Comments for "Was the faculty sufficiently diverse as to advise students in regard to different research aspects related to their thesis project?"	Date
1	The could advise on different aspects but the lack of structure did not allow for enough meetings with thesis committee so that they could give their timely input.	12/3/2015 5:50 PM

Q6 Part C. (2) Mentor

Answered: 26 Skipped: 7



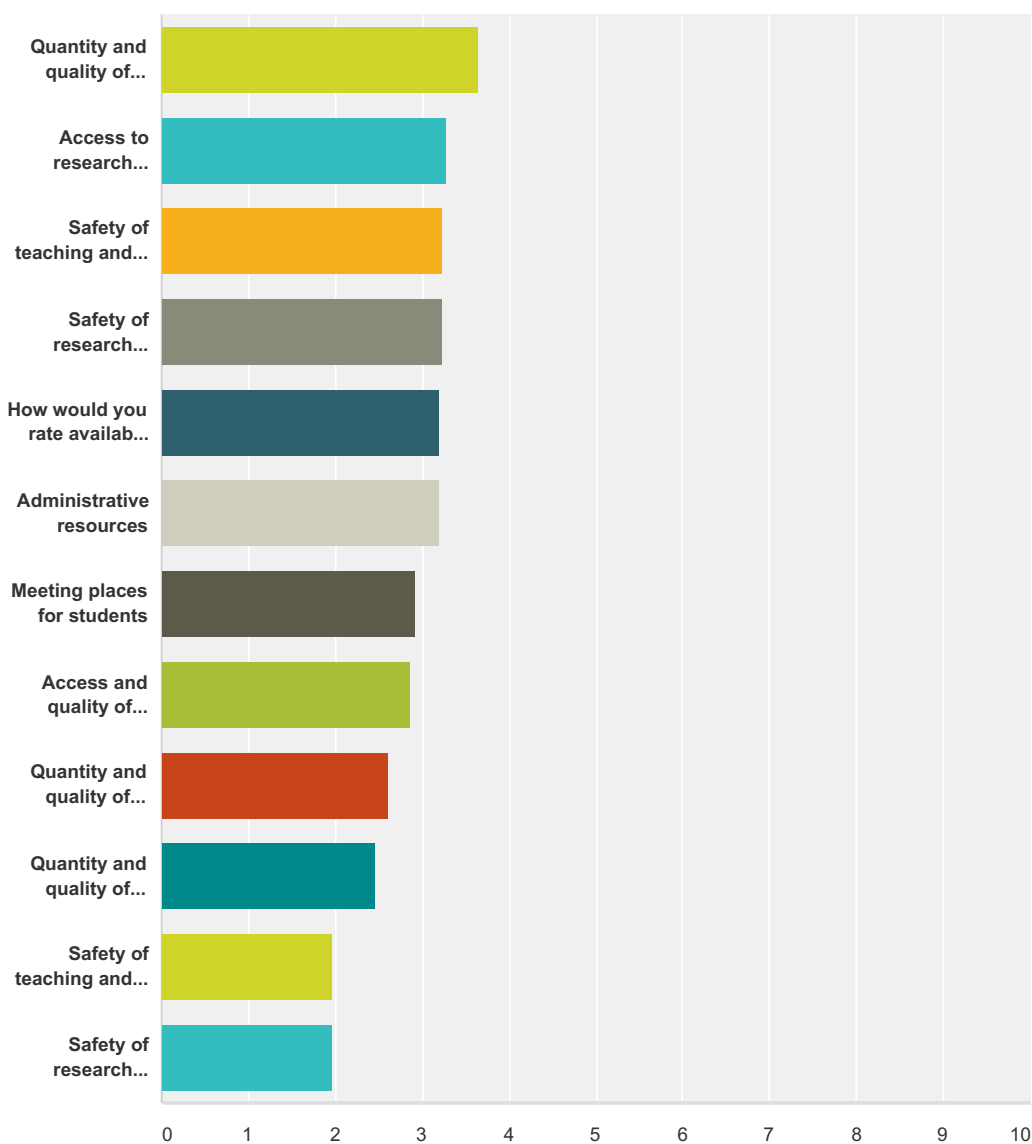
	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Did your mentor listen, give, and receive feedback, and respond perceptively to your questions?	3.85% 1	0.00% 0	19.23% 5	38.46% 10	38.46% 10	26	4.08
Research productivity	0.00% 0	7.69% 2	19.23% 5	38.46% 10	34.62% 9	26	4.00
Did your mentor monitor, document, reflect, and report on your progress?	3.85% 1	11.54% 3	23.08% 6	26.92% 7	34.62% 9	26	3.77
Overall advising	0.00% 0	11.54% 3	26.92% 7	38.46% 10	23.08% 6	26	3.73
Did your mentor orient you about relevant health and safety issues in the laboratory and demonstrate responsible working practices?	0.00% 0	19.23% 5	26.92% 7	15.38% 4	38.46% 10	26	3.73
Did your mentor orient you about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?	7.69% 2	19.23% 5	19.23% 5	23.08% 6	30.77% 8	26	3.50
Did your mentor define a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?	15.38% 4	19.23% 5	30.77% 8	15.38% 4	19.23% 5	26	3.04

#	Comments for "Overall advising"	Date
1	Muchas veces los proyectos son muy interesantes, pero entramos en areas donde no se tiene el conocimiento pleno del tema y esto dificulta aún mas el progreso del estudiante.	12/22/2015 1:29 PM
2	N/A	12/9/2015 3:53 PM
#	Comments for "Research productivity"	Date
1	More communication and integration of the mentor.	1/20/2016 1:24 PM

2	N/A	12/9/2015 3:53 PM
3	The bureaucracy of the University hurts too much the productivity of the research. Waiting more than week to get any order processed and delivered it was just unbearable. Waiting years for an instrument to be fixed is just not acceptable.	11/30/2015 1:31 PM
#	Comments for "Did your mentor define a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?"	Date
1	Often meeting with the mentor.	1/20/2016 1:24 PM
2	aveces hay proyectos tan ambiciosos que 4 o 5 anos no son suficientes tomando en consideración todos los demas problemas de burocracia al momento de hacer ordenes, la instrumentación que no funciona, etc.	12/22/2015 1:29 PM
3	The overall plan was Proposal A, but it was not followed. Mentors there tend to keep adding new unrealistic goals along the way that elongate the student's stay on the program.	12/9/2015 7:13 PM
4	There was miscommunication sometimes about what my mentor wanted and the timeline. It was hard to explain why the experiments take so long.	12/9/2015 6:41 PM
5	The goals are very broadly defined, and sometimes not reasonable for a five year degree.	11/27/2015 6:38 PM
#	Comments for "Did your mentor listen, give, and receive feedback, and respond perceptively to your questions?"	Date
1	Few time this didn't happened, but at the end of my research he helped me with instrumentation to speed up my research.	12/9/2015 6:41 PM
#	Comments for "Did your mentor orient you about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?"	Date
	There are no responses.	
#	Comments for "Did your mentor orient you about relevant health and safety issues in the laboratory and demonstrate responsible working practices?"	Date
	There are no responses.	
#	Comments for "Did your mentor monitor, document, reflect, and report on your progress?"	Date
	There are no responses.	

Q7 Essential resources for faculty, teaching, productivity, and research

Answered: 26 Skipped: 7



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Quantity and quality of off-campus research facilities (Molecular Sciences Building)	0.00% 0	3.85% 1	53.85% 14	15.38% 4	26.92% 7	26	3.65
Access to research facilities	8.00% 2	12.00% 3	32.00% 8	40.00% 10	8.00% 2	25	3.28
Safety of teaching and studying facilities from 8:00 am to 5:00 pm	3.85% 1	19.23% 5	30.77% 8	42.31% 11	3.85% 1	26	3.23
Safety of research facilities from 8:00 am to 5:00 pm	3.85% 1	23.08% 6	26.92% 7	38.46% 10	7.69% 2	26	3.23
How would you rate available resources for teaching and research by faculty and students?	7.69% 2	11.54% 3	38.46% 10	38.46% 10	3.85% 1	26	3.19

Administrative resources	7.69% 2	7.69% 2	42.31% 11	42.31% 11	0.00% 0	26	3.19
Meeting places for students	7.69% 2	23.08% 6	38.46% 10	30.77% 8	0.00% 0	26	2.92
Access and quality of office/working space for students	11.54% 3	30.77% 8	23.08% 6	30.77% 8	3.85% 1	26	2.85
Quantity and quality of classrooms	15.38% 4	30.77% 8	34.62% 9	15.38% 4	3.85% 1	26	2.62
Quantity and quality of research laboratories	11.54% 3	38.46% 10	42.31% 11	7.69% 2	0.00% 0	26	2.46
Safety of teaching and studying facilities during night	42.31% 11	30.77% 8	15.38% 4	11.54% 3	0.00% 0	26	1.96
Safety of research facilities during night	36.00% 9	40.00% 10	16.00% 4	8.00% 2	0.00% 0	25	1.96

#	Comments for "How would you rate available resources for teaching and research by faculty and students?"	Date
	There are no responses.	
#	Comments for "Safety of teaching and studying facilities from 8:00 am to 5:00 pm"	Date
1	In general the Rio Piedras area is not secure, and the position of the building and the area is not also secure too. Building need an urgent security update. We all known that extrange people enter to the building and to the teaching room asking for people that are not part of the graduate program.	11/27/2015 11:20 PM
#	Comments for "Safety of research facilities from 8:00 am to 5:00 pm"	Date
1	Is a dangerous place, extranger of the graduate program enters the building to ask for people, things, etc.	11/27/2015 11:20 PM
#	Comments for "Safety of teaching and studying facilities during night"	Date
1	It was a little bit scary been in the University during the night.	12/9/2015 6:51 PM
2	It was just the situation of the neighbor.	11/30/2015 6:22 PM
3	More effective security.	11/27/2015 11:20 PM
4	keycard access to research building security guards around the building	11/27/2015 6:43 PM
#	Comments for "Safety of research facilities during night"	Date
1	It was a little bit scary been in the University during the night but we were always were with other lab mates.	12/9/2015 6:51 PM
2	keycard access to research building security guards around the building	11/27/2015 6:43 PM
#	Comments for "Quantity and quality of classrooms"	Date
1	More classrooms.	1/20/2016 1:27 PM
2	Chairs/desks with obscene drawings on them should be unacceptable at a respectable graduate department.	12/9/2015 7:23 PM
3	While I was taking my classes the classroom had a lot of mold even though the air conditioning was too cold.	12/9/2015 6:51 PM
4	Only 1 teaching room for all the graduate program, and sometimes the 3rd floor rooms are not available.	11/27/2015 11:20 PM
#	Comments for "Quantity and quality of research laboratories"	Date
1	Some laboratories have to be remodeling.	1/20/2016 1:27 PM
2	Muchos laboratorios necesitan remodelacion.	12/22/2015 1:31 PM
3	Many of the laboratories need major renovations for safety and cleanliness.	12/9/2015 7:23 PM
4	Facundo Bueso is too old. Rio Piedras needs a new research building on campus and near by the Natural Science Building.	12/9/2015 6:51 PM
5	some labs need significant updates. the fume hoods were almost never working	11/27/2015 6:43 PM
#	Comments for "Quantity and quality of off-campus research facilities (Molecular Sciences Building)"	Date
1	I didn't work there, but I visited the building and it looks like is a great facility. But it's off campus.	12/9/2015 6:51 PM

2	Cannot comment	12/3/2015 5:53 PM
3	Back in the days there was no MSB	11/30/2015 6:22 PM
4	I never saw them, so I can't comment	11/27/2015 6:43 PM
#	Comments for "Meeting places for students"	Date
1	They were not terrible but they were also not clean and inviting.	12/9/2015 7:23 PM
2	Few	12/3/2015 5:53 PM
3	Not many meeting places	11/27/2015 6:43 PM
#	Comments for "Access to research facilities"	Date
1	los estacionamientos estan lejos del edificio de investigacion	12/22/2015 1:31 PM
2	To be honest, with the lack of a reliable university transportation system and no parking (even for professors) it was quite challenging make it there sometimes	11/30/2015 6:22 PM
3	Molecular Science building it is not practical for all students. Students need instrumentation, like IR, MS, UV, etc, available at Facundo Bueso. Going to MSB for that include time for traveling to the building, appointments for running samples, etc.	11/27/2015 11:20 PM
#	Comments for "Access and quality of office/working space for students "	Date
1	Offices back when I was there were small and dirty, with mold on the ceiling. It was also not safe at night. Certainly not the type of place where you feel comfortable staying for long hours to work and study.	12/9/2015 7:23 PM
2	To many students their office/working space is inside the lab, Besides a hood, making a dangerous situation. Space are limited, but many offices in the building are closed or without use.	11/27/2015 11:20 PM
3	varies between laboratories.	11/27/2015 6:43 PM
#	Comments for "Administrative resources"	Date
1	you must do something with personnel at the graduate program. Is it really necessary? Wilma always did a great job. Other than that...	12/9/2015 2:01 PM
2	Lack of administrative support	12/3/2015 5:53 PM

Q8 Which recommendations can you give to improve the student experience in the graduate program?

Answered: 5 Skipped: 28

#	Responses	Date
1	Students are professionals looking to increase their knowledge when pursuing a higher degree. Therefore, the environment must reflect the standards aimed when studying for a MS or PhD.	1/19/2016 5:43 PM
2	You need to look at other schools and mimic what they are doing right. This program is way too antique.	12/9/2015 2:01 PM
3	Qualify the progress report of the student. Go over the progress of the student and push them to the max.	11/30/2015 6:22 PM
4	Sometimes students are unmotivated because we don't have good orientation. We don't know what we really want, or what we gonna do after graduation. People to talk about what to do after, will be very useful for many, good orientation system. An improvement in the facilities can help in the moral of the students, a place where we feel secure, is a place that can be call home, and a place that we can be there for long hours.	11/27/2015 11:20 PM
5	some seminars or workshops that relate to job seeking. Academia and industry have very different requirements, and the graduate program does not prepare you to apply for a job.	11/27/2015 6:43 PM

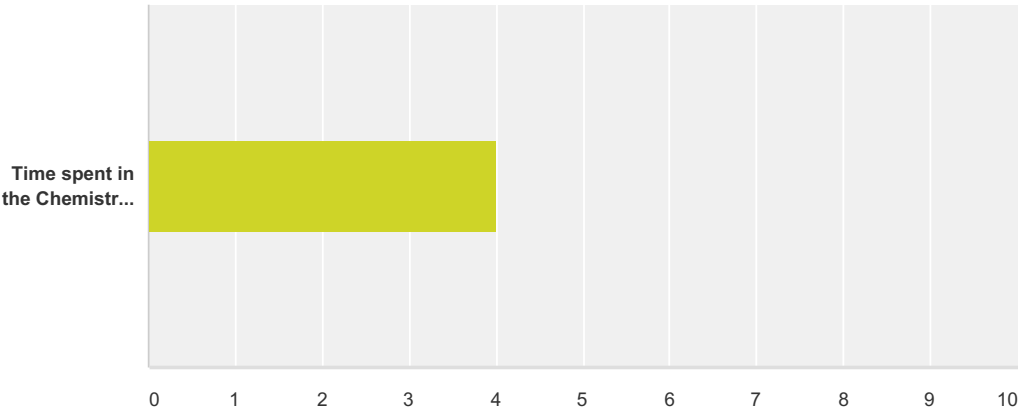
Q9 What modifications, if any, would you suggest to enrich the curriculum?

Answered: 5 Skipped: 28

#	Responses	Date
1	Better facilities, more and better equipment, and engagement from faculty with students.	1/19/2016 5:43 PM
2	More speacialized courses. Invited professors.	12/9/2015 2:01 PM
3	Get rid of the classical model of chemistry. Nowadays there are not boundaries between disciplines. Saying that, add more interdisciplinary divisions to the department and joint appointments, such as Materials Chemistry Division.	11/30/2015 6:22 PM
4	Not only teaching courses, TRAINING students. Laboratory experiences in different techniques for grad students.	11/27/2015 11:20 PM
5	all students should take a teaching STEM courses class.	11/27/2015 6:43 PM

Q10 Demographic profile

Answered: 25 Skipped: 8

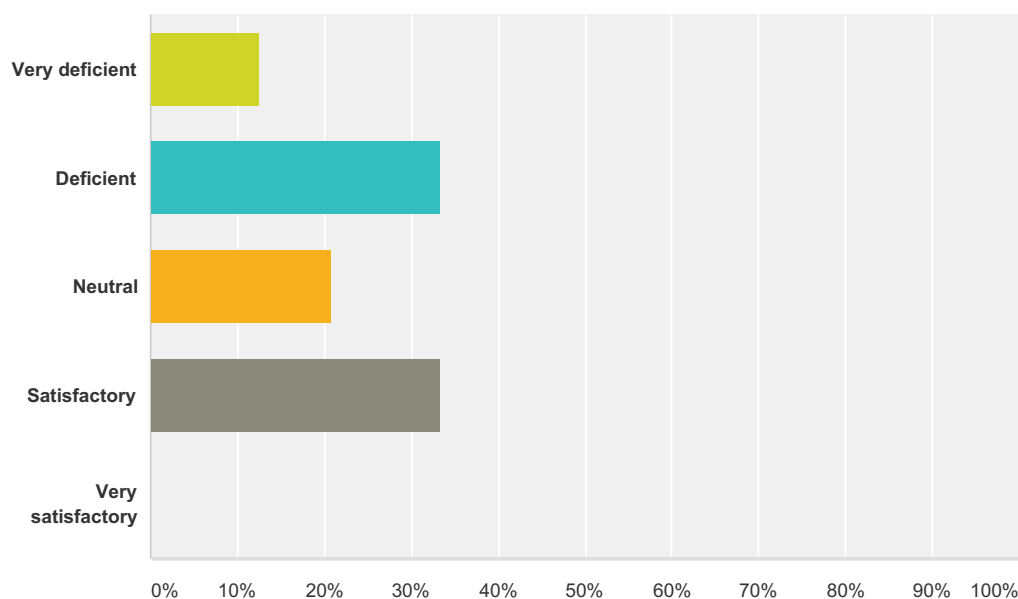


	0-2 years	3-4 years	5-6 years	7-8 years	9 or more years	Total	Weighted Average
Time spent in the Chemistry Graduate Program	0.00% 0	0.00% 0	28.00% 7	44.00% 11	28.00% 7	25	4.00

#	comments	Date
1	6 and a half years.	12/9/2015 4:01 PM
2	Master + PhD	11/30/2015 10:20 PM

Q11 The time spent to complete the degree was

Answered: 24 Skipped: 9

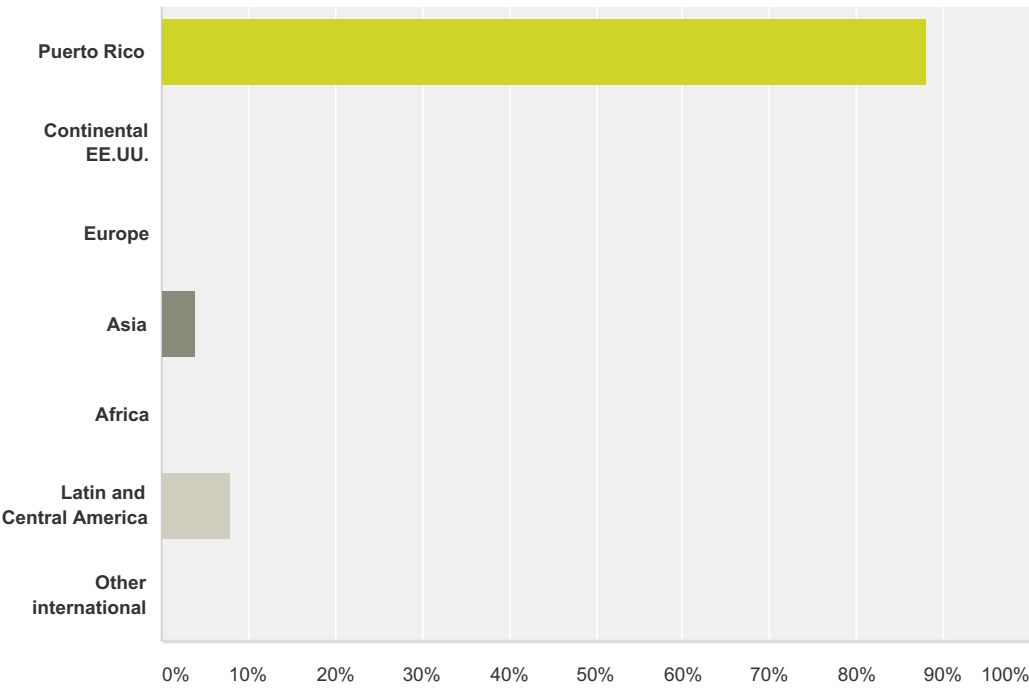


Answer Choices	Responses
Very deficient	12.50% 3
Deficient	33.33% 8
Neutral	20.83% 5
Satisfactory	33.33% 8
Very satisfactory	0.00% 0
Total	24

#	Please explain the particular circumstances.	Date
1	The difficulty on the thesis project and unrealistic goals about the project. Also, delay in chemicals orders and instruments not working most of the time.	1/20/2016 1:33 PM
2	mi embarazo me atrasó un año completo, pero apesar de esto aveces tratar reacciones recomendadas por el profesor que estaban fuera de la propuesta me atrasó mucho.	12/22/2015 1:36 PM
3	It took me very long, but I had the opportunity to travel national and internationally for conferences and that takes time. Also I went to few different Universities in USA to advance my research.	12/9/2015 6:56 PM
4	Too long. Shouldn't have spent more than 5 years in the program. There was a strike that lasted 4 months; constructions in the Facundo Bueso building forcing facilities move around;	12/9/2015 4:01 PM
5	1. strikes 2. materials take a long time to be received 3. research projects have unrealistic time to be completed 4. difficulty to coordinate all committee members to carry out the proposals and thesis defense 5. not all semesters have courses available 6. etc.	12/2/2015 10:35 AM
6	Muchos de los experimentos proveían resultados no concluyentes (guiados al objetivo) y se tuvieron que diseñar nuevos experimentos, re-plantear hipótesis y cambiar objetivos.	11/30/2015 4:16 PM
7	Personal problems	11/28/2015 6:32 PM

Q12 Place of origin

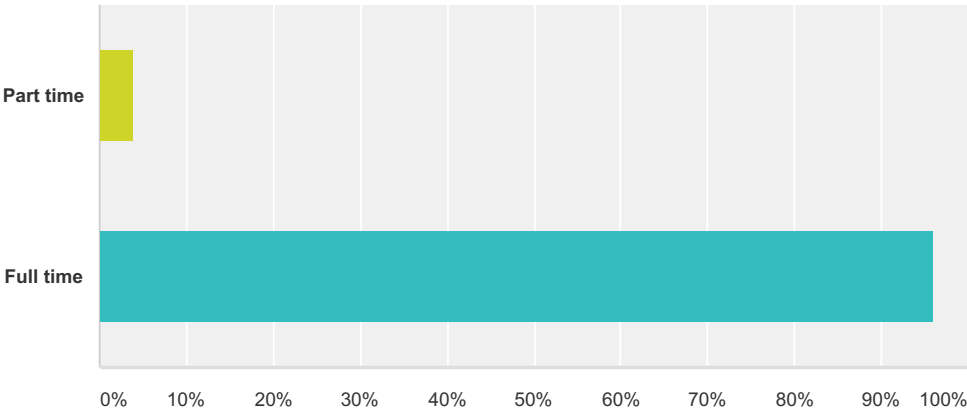
Answered: 25 Skipped: 8



Answer Choices	Responses	
Puerto Rico	88.00%	22
Continental EE.UU.	0.00%	0
Europe	0.00%	0
Asia	4.00%	1
Africa	0.00%	0
Latin and Central America	8.00%	2
Other international	0.00%	0
Total		25

Q13 You studied

Answered: 25 Skipped: 8

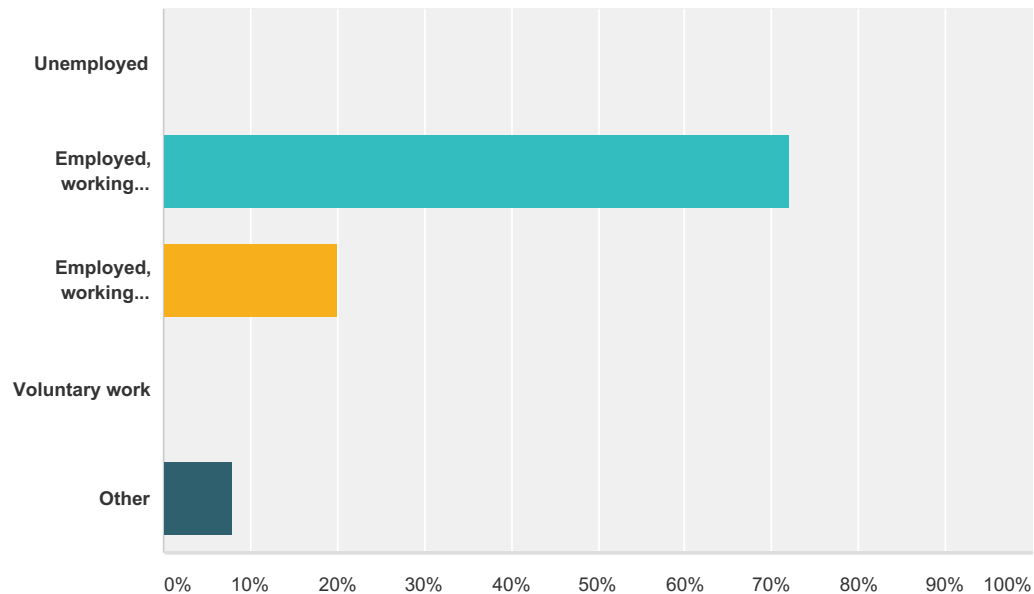


Answer Choices		Responses	
Part time		4.00%	1
Full time		96.00%	24
Total			25

#	If part time, why?	Date
1	Family	1/19/2016 5:47 PM

Q14 Employment status

Answered: 25 Skipped: 8

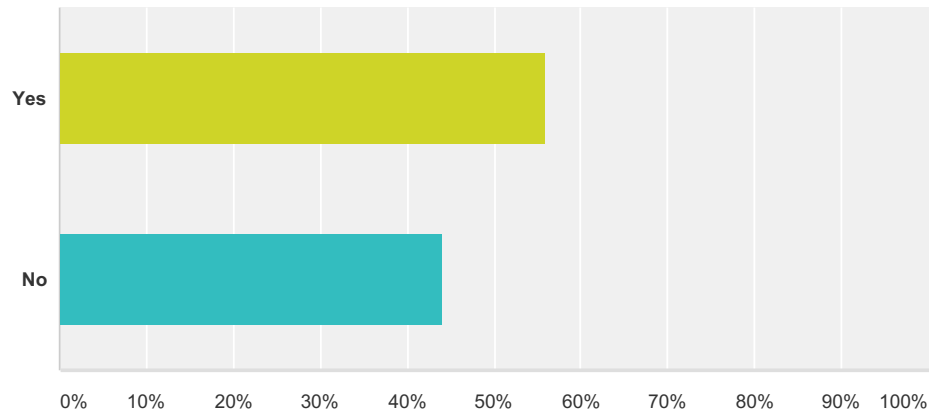


Answer Choices	Responses
Unemployed	0.00% 0
Employed, working full-time	72.00% 18
Employed, working part-time	20.00% 5
Voluntary work	0.00% 0
Other	8.00% 2
Total	25

#	comments	Date
1	trabajaba los fines de semana	12/22/2015 1:36 PM
2	Student in another field.	12/3/2015 5:55 PM
3	Full-time Postdoc looking for job	12/2/2015 10:35 AM
4	Working full time in Industry	11/30/2015 6:24 PM
5	El trabajo responde a haberme quedado en PR (decisión personal).	11/30/2015 4:16 PM

Q15 If employed, are you working in the field in which you specialized during your graduate studies?

Answered: 25 Skipped: 8

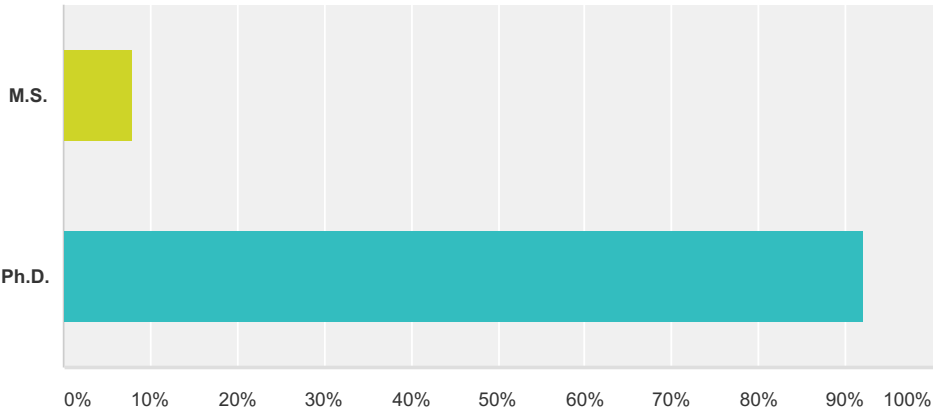


Answer Choices	Responses
Yes	56.00% 14
No	44.00% 11
Total	25

#	comments	Date
1	Chemistry Profesor.	1/20/2016 1:33 PM
2	Working with surface chemistry	11/30/2015 6:24 PM
3	Estoy en la academia ofreciendo cursos generales no de mi especialidad.	11/30/2015 4:16 PM

Q16 Degree type

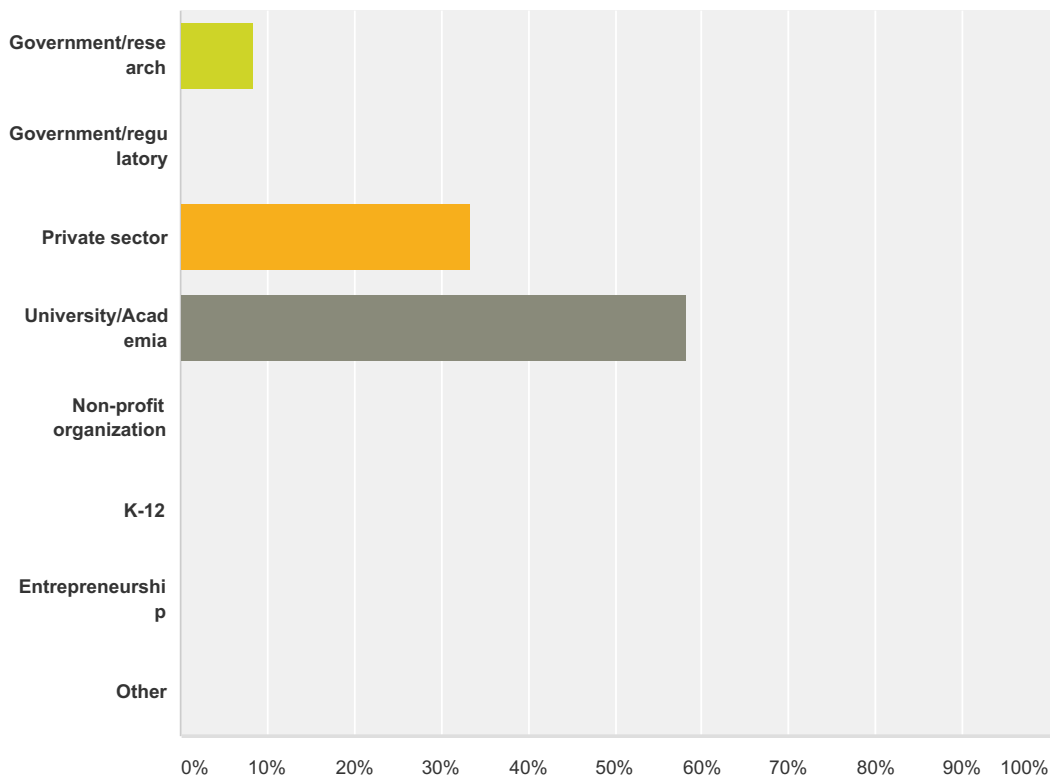
Answered: 25 Skipped: 8



Answer Choices	Responses	
M.S.	8.00%	2
Ph.D.	92.00%	23
Total		25

Q17 If employed, in which sector(s) are you currently working?

Answered: 24 Skipped: 9

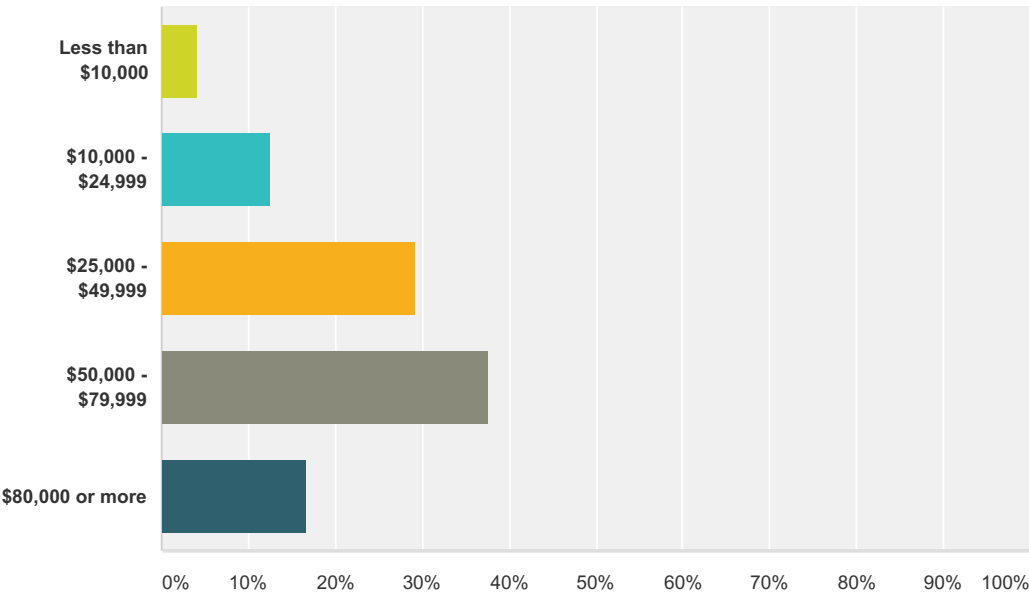


Answer Choices	Responses
Government/research	8.33% 2
Government/regulatory	0.00% 0
Private sector	33.33% 8
University/Academia	58.33% 14
Non-profit organization	0.00% 0
K-12	0.00% 0
Entrepreneurship	0.00% 0
Other	0.00% 0
Total	24

#	comments	Date
1	ahora mismo estoy en la academia	12/22/2015 1:36 PM
2	Previously academia	12/3/2015 5:55 PM

Q18 If employed, what is your annual income?

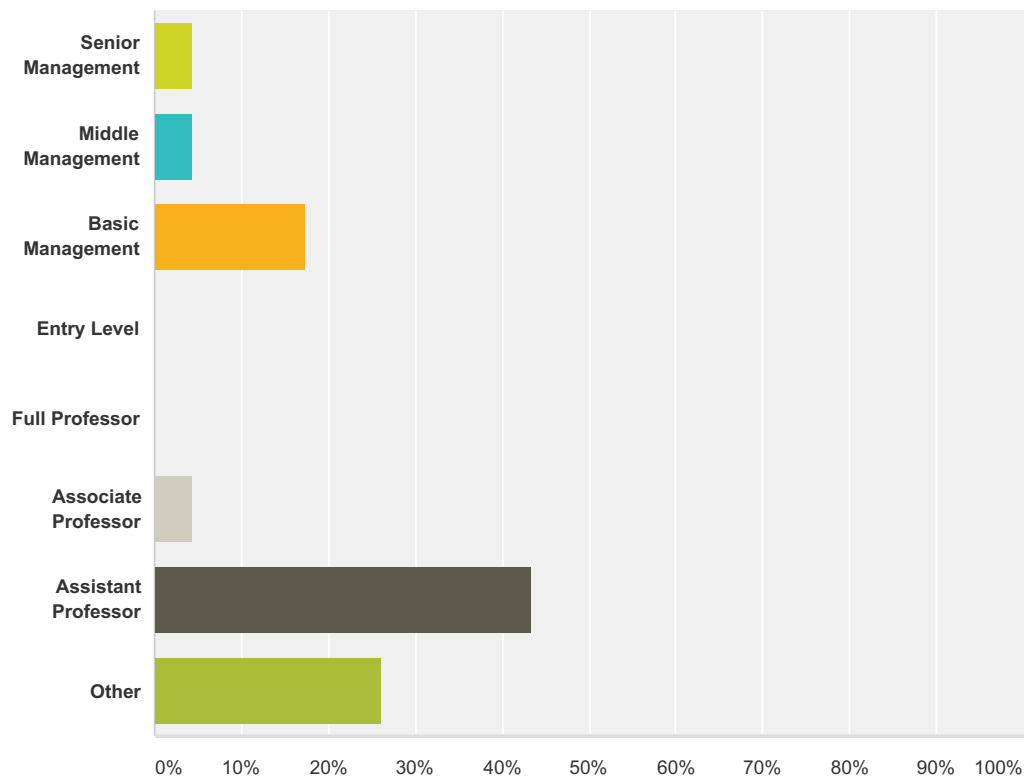
Answered: 24 Skipped: 9



Answer Choices	Responses
Less than \$10,000	4.17%1
\$10,000 - \$24,999	12.50%3
\$25,000 - \$49,999	29.17%7
\$50,000 - \$79,999	37.50%9
\$80,000 or more	16.67%4
Total	24

Q19 Which of the following best describes your current job level?

Answered: 23 Skipped: 10



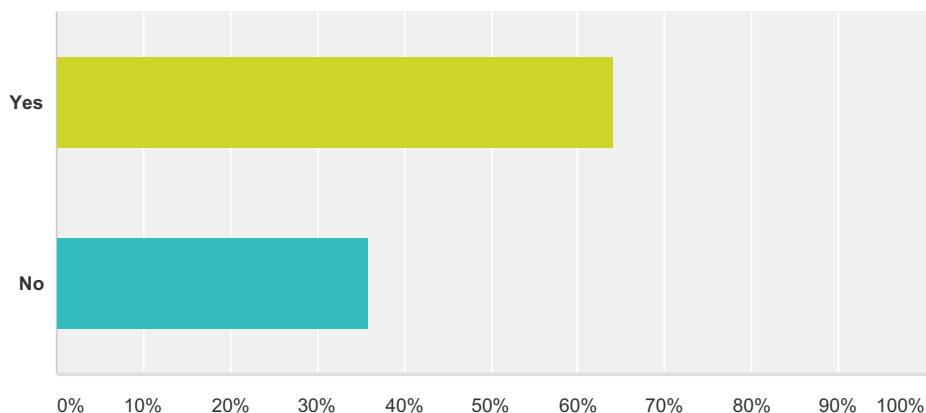
Answer Choices	Responses
Senior Management	4.35% 1
Middle Management	4.35% 1
Basic Management	17.39% 4
Entry Level	0.00% 0
Full Professor	0.00% 0
Associate Professor	4.35% 1
Assistant Professor	43.48% 10
Other	26.09% 6
Total	23

#	comments	Date
1	tiempo parcial	12/22/2015 1:36 PM
2	Senior Scientist	12/9/2015 9:02 PM
3	I do research but I am staring to do management.	12/9/2015 6:56 PM
4	Postdoc	12/9/2015 4:01 PM

5	Postdoc	12/2/2015 10:35 AM
6	Senior Chemist at R&D	11/30/2015 6:24 PM
7	Adjunct faculty	11/28/2015 6:32 PM
8	Postdoctoral Researcher, just accepted an Assistant Professor position starting August 2016	11/27/2015 6:45 PM

Q20 Would you recommend to a friend to pursue studies in the Chemistry Graduate Program?

Answered: 25 Skipped: 8

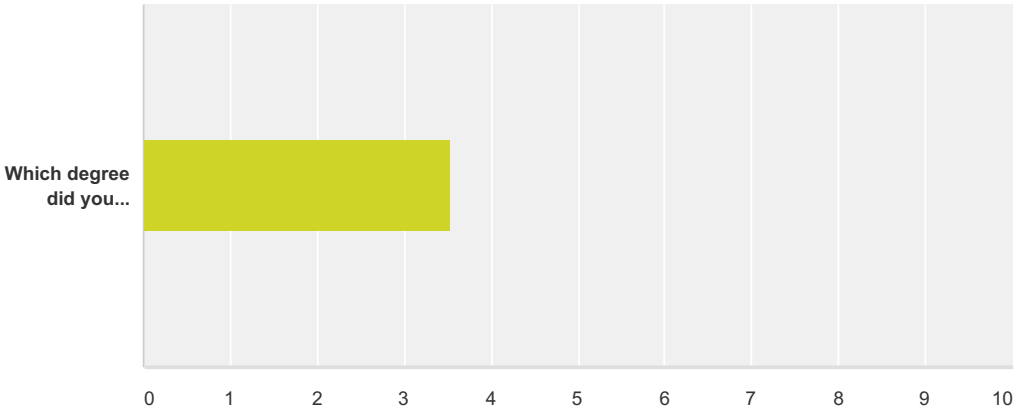


Answer Choices	Responses
Yes	64.00% 16
No	36.00% 9
Total	25

#	comments	Date
1	I will not recommend it, If the conditions and requirements are the same as when I was in the program. Although I am really sure that the Program can improve it.	1/20/2016 1:33 PM
2	en términos generales no porque cuando termine de estudiar no va a encontrar trabajo. Solo se están limitando a dar cursos a tiempo parcial en la academia y en la industria son muy escasos los trabajos para personas con un PhD.	12/22/2015 1:36 PM
3	It hurts to answer "no" but I cannot currently recommend a friend to pursue studies there unless changes are made to improve the overall experience, including the facilities, resources, guidance, and the management of goals to make sure people properly develop their skills and can graduate at a reasonable time.	12/9/2015 7:28 PM
4	Yes because have good research areas and instruments, but not if he/she want to finish fast.	12/2/2015 10:35 AM
5	Realmente depende del amigo. Es importante considerar las razones porque las que se quiere hacer estudios graduados en ciencia porque hay muchas otras disciplinas que se pueden estudiar. De entender que mi amigo quiere completar un PhD en química le recomendaría hacerlo en Estados Unidos.	11/30/2015 4:16 PM
6	Not the way it is currently structured. The program needs a shot of new funds so that students can actually spend time doing research and not troubleshooting problems within the research facilities.	11/27/2015 6:45 PM

Q21 If you continued studies after graduating from the program, please answer:

Answered: 19 Skipped: 14

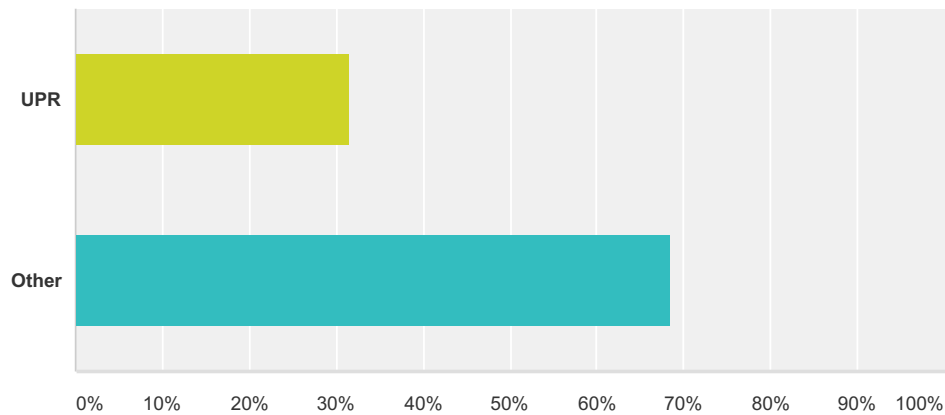


	Ph.D./Ed.D	Juris Doctor	Master	Postdoc.	Other	Total	Weighted Average
Which degree did you pursued?	21.05% 4	0.00% 0	0.00% 0	63.16% 12	15.79% 3	19	3.53

#	comments	Date
1	por el momento no.	12/22/2015 1:40 PM

Q22 In which university?

Answered: 19 Skipped: 14

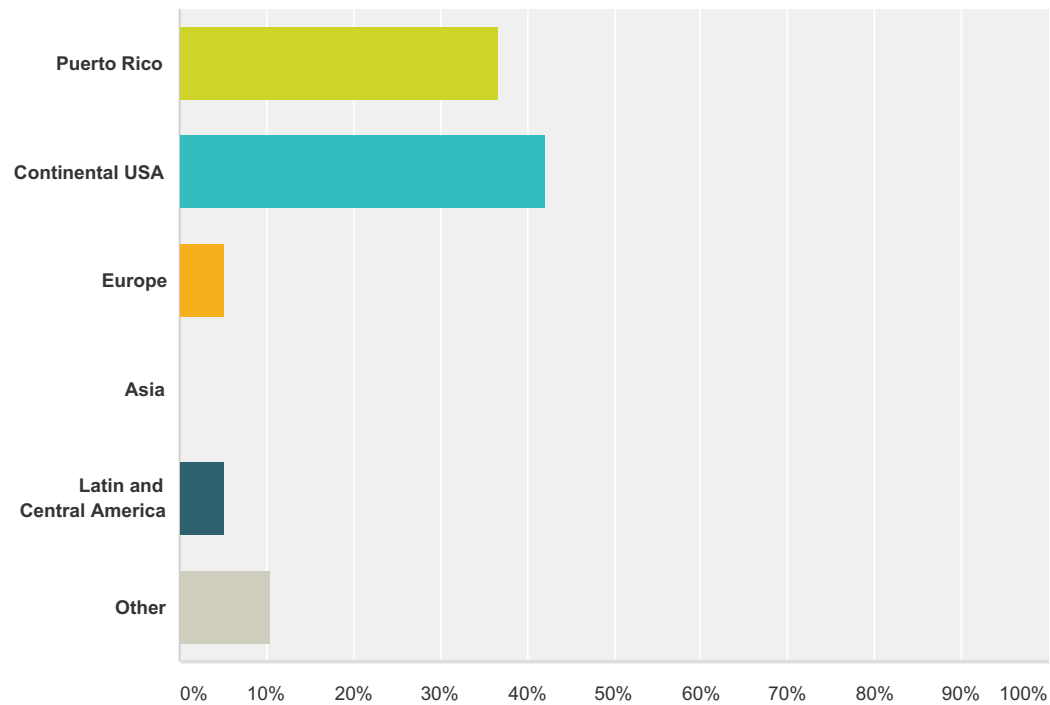


Answer Choices	Responses
UPR	31.58%6
Other	68.42%13
Total	19

#	comments	Date
1	por el momento no.	12/22/2015 1:40 PM
2	New York University	11/27/2015 6:45 PM

Q23 Where?

Answered: 19 Skipped: 14

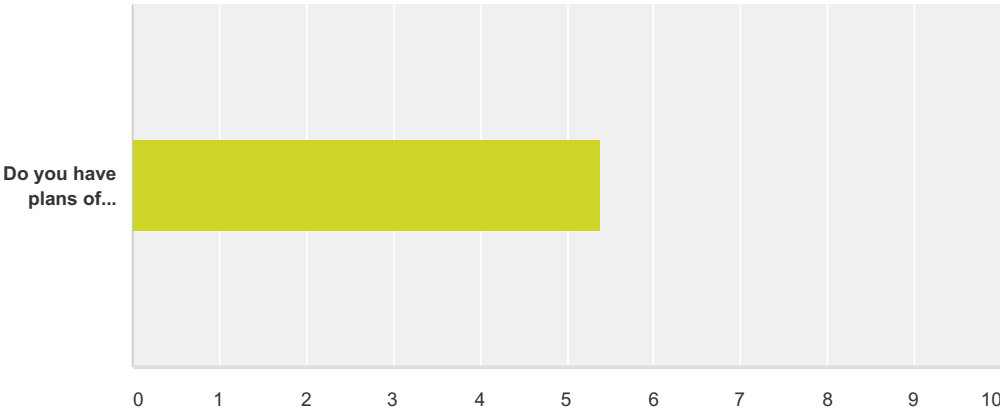


Answer Choices	Responses
Puerto Rico	36.84% 7
Continental USA	42.11% 8
Europe	5.26% 1
Asia	0.00% 0
Latin and Central America	5.26% 1
Other	10.53% 2
Total	19

#	comments	Date
1	and USA.	12/9/2015 5:08 PM

Q24 If you did not pursue further studies after graduating from our graduate program, please answer:

Answered: 13 Skipped: 20

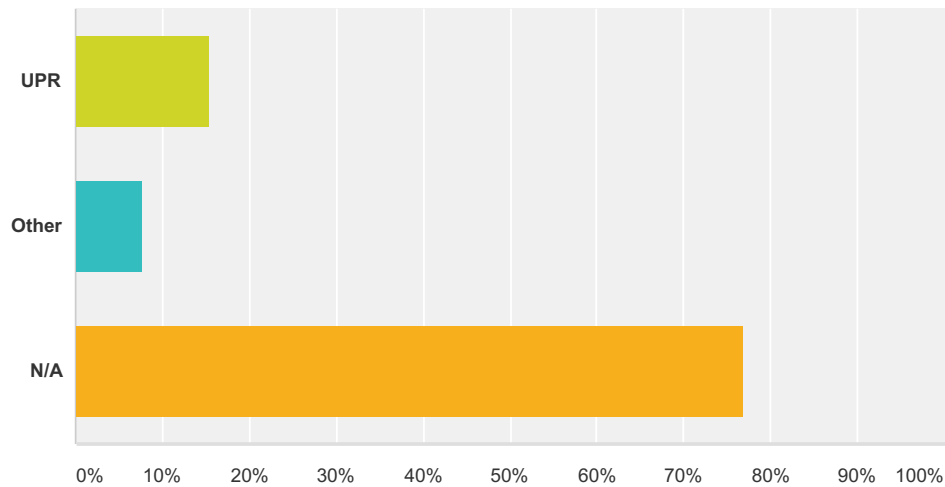


	Ph.D./Ed.D.	Juris Doctor	Masters	Postdoc.	Other	I have no plans of initiating further studies within the next five years	Total	Weighted Average
Do you have plans of initiating further studies for one of the following degrees within the next five years?	0.00% 0	15.38% 2	0.00% 0	0.00% 0	0.00% 0	84.62% 11	13	5.38

#	comments	Date
1	Thinking about, maybe in two years.	11/27/2015 11:23 PM

Q25 In which university?

Answered: 13 Skipped: 20

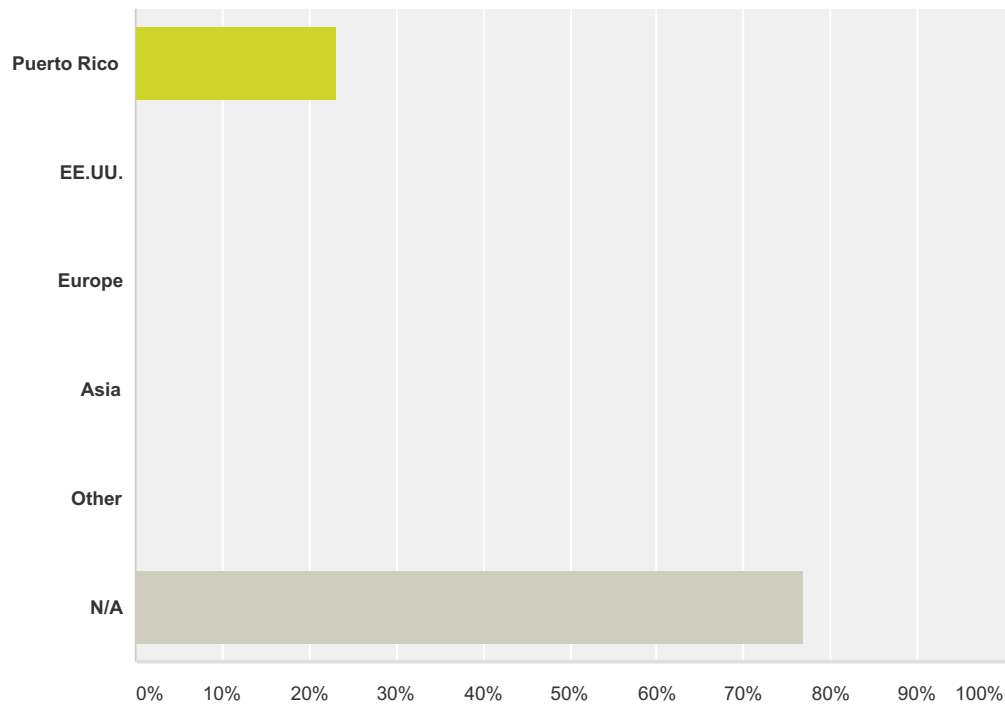


Answer Choices		Responses	
UPR		15.38%	2
Other		7.69%	1
N/A		76.92%	10
Total			13

#	comments	Date
	There are no responses.	

Q26 Where?

Answered: 13 Skipped: 20



Answer Choices	Responses
Puerto Rico	23.08%3
EE.UU.	0.00%0
Europe	0.00%0
Asia	0.00%0
Other	0.00%0
N/A	76.92%10
Total	13

#	comments	Date
	There are no responses.	

Q27 Additional final comments

Answered: 1 Skipped: 32

#	Responses	Date
1	Mi experiencia durante mi PhD fue una montana rusa. Hubo desiluciones, alegría, euforia, decepcion y hasta deseos de no terminar, pero de todo en la vida se aprende y decidí agarrar las mejores experinecias vividas y el haber conocido a una facultad extraordinaria. Gracias a todos ellos porque de una manera u otra me ayudaron a sobrevivir en esa travesia de mi vida.	12/22/2015 1:40 PM

Q28 If you wish to be considered to participate in a focus group on these subjects, please complete the following:

Answered: 1 Skipped: 32

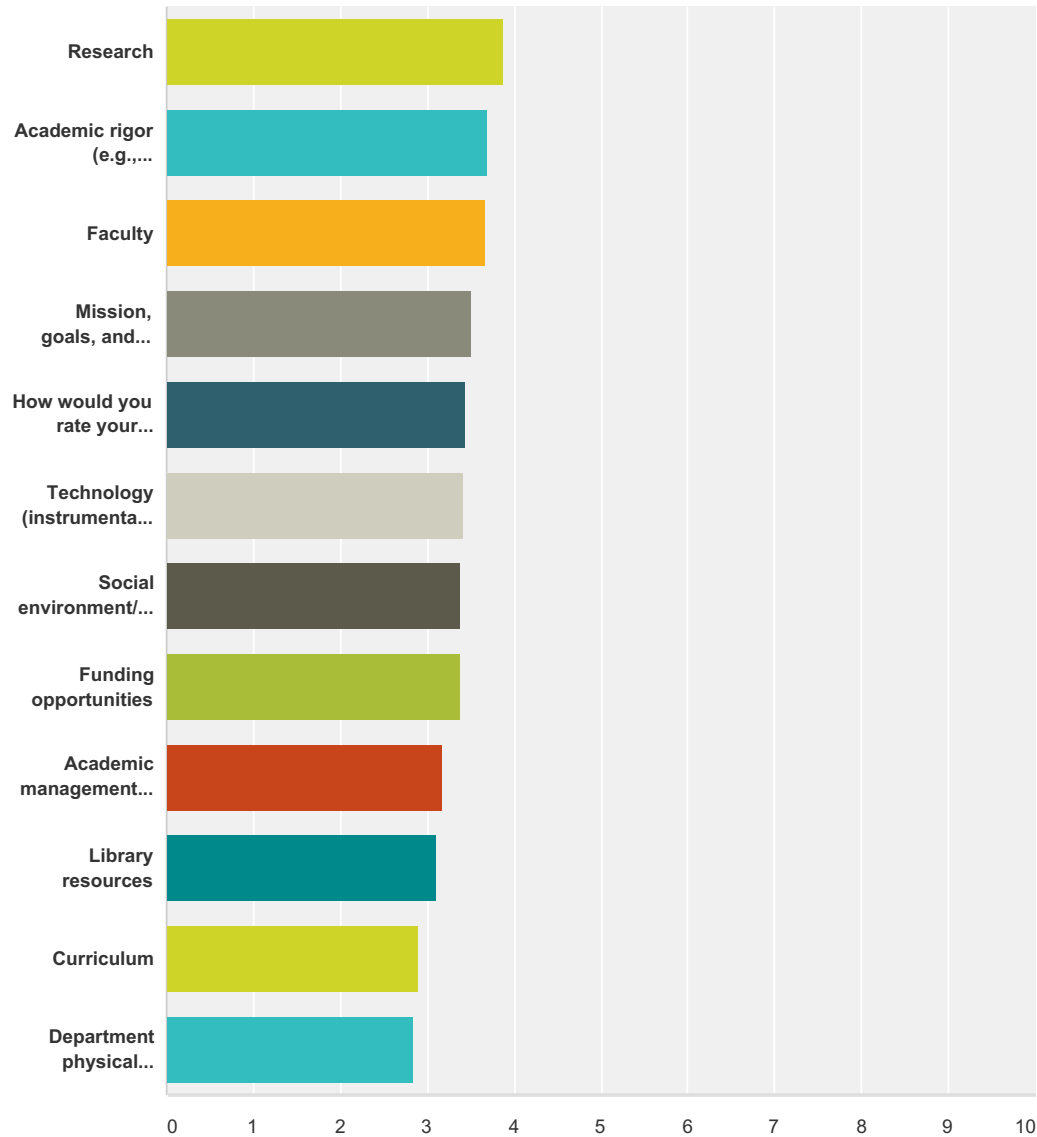
Answer Choices	Responses
Name	100.00% 1
Company	100.00% 1
Address	100.00% 1
Address 2	0.00% 0
City/Town	100.00% 1
State/Province	100.00% 1
ZIP/Postal Code	100.00% 1
Country	100.00% 1
Email Address	100.00% 1
Phone Number	100.00% 1

#	Name	Date
1	Agustin Diaz	11/30/2015 6:25 PM
#	Company	Date
1	REM Surface Engineering	11/30/2015 6:25 PM
#	Address	Date
1	2107 Longwood Dr	11/30/2015 6:25 PM
#	Address 2	Date
	There are no responses.	
#	City/Town	Date
1	Brenham	11/30/2015 6:25 PM
#	State/Province	Date
1	TX	11/30/2015 6:25 PM
#	ZIP/Postal Code	Date
1	77833	11/30/2015 6:25 PM
#	Country	Date
1	United States	11/30/2015 6:25 PM
#	Email Address	Date
1	adiaz@remchem.com	11/30/2015 6:25 PM
#	Phone Number	Date
1	9792208737	11/30/2015 6:25 PM

Appendix 3

Q1 General impression of the program

Answered: 36 Skipped: 0



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Research	2.86% 1	8.57% 3	22.86% 8	28.57% 10	37.14% 13	35	3.89
Academic rigor (e.g., intellectually challenging)	5.71% 2	8.57% 3	22.86% 8	37.14% 13	25.71% 9	35	3.69
Faculty	2.78% 1	13.89% 5	16.67% 6	47.22% 17	19.44% 7	36	3.67
Mission, goals, and objectives	2.78% 1	5.56% 2	38.89% 14	44.44% 16	8.33% 3	36	3.50
How would you rate your overall graduate experience?	2.78% 1	13.89% 5	33.33% 12	36.11% 13	13.89% 5	36	3.44

Technology (instrumentation, IT, network)	5.56% 2	22.22% 8	19.44% 7	30.56% 11	22.22% 8	36	3.42
Social environment/Peer group support	5.56% 2	11.11% 4	38.89% 14	27.78% 10	16.67% 6	36	3.39
Funding opportunities	19.44% 7	2.78% 1	27.78% 10	19.44% 7	30.56% 11	36	3.39
Academic management (coordination, student orientation, web site, etc.)	17.14% 6	14.29% 5	25.71% 9	20.00% 7	22.86% 8	35	3.17
Library resources	13.89% 5	16.67% 6	30.56% 11	22.22% 8	16.67% 6	36	3.11
Curriculum	12.12% 4	33.33% 11	18.18% 6	24.24% 8	12.12% 4	33	2.91
Department physical installations/Research facilities	22.22% 8	22.22% 8	22.22% 8	16.67% 6	16.67% 6	36	2.83

#	Comments for "How would you rate your overall graduate experience?"	Date
1	Better and more varied courses	1/21/2016 9:50 AM
2	Experience with one profesor does not follow the student review process under s strict sense	1/19/2016 11:39 PM
3	No hay disponibilidad de cursos, los recursos y materiales para la investigacion son muy pocos. Deberian dar cursos completos (no seminarios de 1 hr) para poder escribir propuesta y articulos cientificos.	1/19/2016 3:04 PM
4	I learnt a lot knowledge during this term, teachers are very good.	1/19/2016 12:45 PM
5	Todo el proceso de compra de materiales, servicio, comprar equipo es demasiado lento. Creo q ademas de tratar de reducir el tiempo de graduacion mejorando cursos o eliminando requisitos deben revisar estos procesos tan tediosos y lentos. Me parece inaceptable que tome 6 meses recibir reactivos, obviamente nos vamos a tardar en graduar	1/19/2016 11:13 AM
6	My main dissatisfaction arises from the poor offer of elective courses directed toward real hands on applications.	1/19/2016 9:52 AM
7	More guidance of the advisor and the program. Periodic evaluation of the professors are needed. The security of the Facundo Bueso Building is poor at best and it is nearly impossible to work at night, holidays or weekends when there is less people in the University. There is a need to follow up on maintenance of the equipment bought like NMR, GC/MS, etc.	12/15/2015 1:30 PM
8	It takes too many years to graduate, there is poor faculty support for students to have internships/coop experiences outside the lab, core classes have not been updated, deficient facilities (facundo bueso building) among others. I will improved it with update core classes, coop experiences, better security, better facilities and less requirements.	12/14/2015 9:46 PM
9	I made most of my recommendations on the questions that follow this one, but I want to add that... professors should undergo rigorous training in education and pedagogy. My worst experience in graduate school was in the first year. See below for reasons why: 1) There are professors that were absent in most of the academic year. Then they send a graduate student to give the class that won't be able to give the quality of teaching and challenge to the students that a professor has. That is an act disrespect for students. 2) There are professors that gave exams inconsistent on the material provided. 3) There are professors that gave exams that weren't pedagogical. Two examples: (1) An exam should not exceed 2-3 hours. Any exam designed to exceed that limit is disrespectful, unhealthy for the students, and nonsensical. (2) Exams should challenge graduate students through the art of discussions, not by "choosing the best answer" related questions. 4) Professors should engage more with students in their learning experience. Be willing to answer questions with respect, provide opportunities to students to improve, bring materials for us to learn through our hands and group discussions. Teach with new methods. Don't give a boring presentation that has no relevant information. Professors should have an educational consultant to give them feedback to enrich the academic experience to students. Not only in in courses, but in their graduate school requirements as well.	12/14/2015 4:37 PM
10	Es muy dificil para los estudiantes que entramos sin conocer a ningún profesor, no pude trabajar en el lab los primeros semestres por lo que perdí tiempo. Luego una vez en el lab, comprar material es muy dificil, el sistema de PO es muy lento.	12/14/2015 12:12 PM
11	Administrative procedures need to improve.	12/14/2015 9:39 AM
12	Academic curriculum is not complete or diversified for those students who are currently enrolled in the biochemistry graduate. Graduate program have improved some areas such as graduate seminar organization however the alternatives for biochemistry students as in the case of elective courses and also seminar topics for the graduate seminar are limited. In my opinion there is a need of more biochemist professor at the program.	12/14/2015 8:09 AM

13	Mejor salario a los asistentes de cátedra, mayor evaluación a los profesores y personal del programa. También debe haber material anterior de las clases y exámenes cualificativos de practica en la biblioteca o blackboard.	12/14/2015 8:06 AM
#	Comments for "Mission, goals, and objectives"	Date
1	I understand that the graduate program is challenging enough in order to fully develop students from a bachelor's degree to a Ph.D	1/21/2016 9:50 AM
2	The program is too long due to unnecessary requisites like proposal B and graduate seminar attendance for so long.	1/20/2016 4:40 PM
3	Examination practices in laboratory teaching requires overhaul	1/19/2016 11:39 PM
4	Good but cost me a lot of time to finish.	1/19/2016 12:45 PM
5	Yearly assessment of the program, students must be part of this process or at least get a document with the milestones reached.	12/18/2015 12:06 PM
6	El programa parece estar desenfocado. Aunque cada uno de nosotros los estudiantes tenemos nuestros proyectos, no parece que el programa esta enfocado en mejorar ninguna de las areas en las cuales se encuentra deficiente.	12/14/2015 8:12 PM
7	I recommend that the "mission, goals, and objectives" should be expressed more through actions that on paper. Improvements have been made, but there is still work to do in general.	12/14/2015 4:37 PM
8	Honestamente nunca me ha interesado leerlos.	12/14/2015 12:12 PM
9		12/14/2015 8:09 AM
10	Debe mejorarse el tiempo total que toma en hacerse una maestría o doctorado con la misión de tratar que mas del 50% del estudiantado se gradué en 5 años. Para esto tendría que reformularse el programa estableciendo de forma obligatoria que se presenta la propuesta A durante el segundo año de estudios graduados, el seminario en tercer año y propuesta B en cuarto año.	12/14/2015 8:06 AM
#	Comments for "Curriculum"	Date
1	More varied courses are necessary.	1/21/2016 9:50 AM
2	May need courses options in computer science	1/19/2016 11:39 PM
3	Muy antiguo y el proceso para mejorarlo es muy difíciles por profesores que no quieren mejorar	1/19/2016 3:04 PM
4	Good but I hope we can have the documents about class in advance and entirely.	1/19/2016 12:45 PM
5	Mejores cursos, hay areas de investigacion que carecen de buenos cursos	1/19/2016 11:13 AM
6	Curriculum is mostly academic oriented, there's a lack of industry oriented courses which limits the opportunity for students who are interested in working in this field. Also some courses follow an old school system where grade is mostly based in exams, and leave out other useful evaluation assignments that can help students to develop new skills (i.e, scientific writing, oral presentation).	1/19/2016 9:52 AM
7	There are some areas in which the variety of classes available is really deficient.	12/15/2015 1:30 PM
8	Demasiados requisitos por lo que el "time to degree" es bastante alto comparado a otras universidades en el resto del mundo.	12/15/2015 12:59 PM
9	Too many classes and requirements. I will improve it with updating the classes and asking less requirements and more internships/coop experiences	12/14/2015 9:46 PM
10	Se necesitan mas cursos especializados y reestructuración del primer año como estudiante graduado. Ese primer año es realmente un post-bach, no un programa de Ph.D. La prueba diagnostica se debe actualizar o descontinuarla en su totalidad pues sus resultados no se utilizan para nada real. Luego siguen los tres cursos modulares los cuales solo orgánica es claramente un curso graduado, el resto son mayormente repases de los cursos subgraduados con un toque final de graduado. En ese tiempo se pierde un año, extendiendo la estadia del estudiante graduado innecesariamente. En eso se incluye los exámenes calificativos. Aunque creo en ellos entiendo que una vez al año nuevamente atrasa la estadia del estudiante innecesariamente cuando podría estar moviendo su proyecto. Estos exámenes deberían ser esporádicamente basados en artículos científicos constantemente siendo actualizados y el estudiante debe tener una cantidad limite para repetir por materia en un transcurso de años de 2 o 3. Haciendo que el enfoque del programa sea en research principalmente Los estudiantes que necesiten entrar por post-bach deberían hacerlo, pero hay estudiantes que entran a un programa lento y frustrante sin variedad de cursos. Sobre el resto de las actividades, el estudiante debería tener una comunicación mas abierta con su comité, al menos una conversación, no evaluación, de progreso una vez al año para fomentar el ambiente y conversación científica. Sobre el seminario, solo los profesores del comité del estudiante debe evaluar a dicho estudiante y estos deben ser mucho mas estrictos con estos. Ser consciente de que una persona se supone que se pare en frente a dar un curso de un tema, no hablar de un solo review o de 3 artículos que encontré en los cuales usualmente se basan su propuesta B. Si no es posible, eliminar dicho requisito por completo pues nuevamente el programa no lo toma en serio.	12/14/2015 8:12 PM

11	At least 6 things can be done: (1) Provide various short courses to enrich the academic experience of students. Either faculty professor or invited professors (local, national, and international) can enrich the curricula. The courses offered are very limited. (2) For Ph.D. students, combine Graduate Seminar and Proposal B to one requisite. It will surely lower the high average of years to graduate from this program. (3) The courses offered on the first year to graduate students should be updated. I noticed that professors recycle their same material that they teach for many years. It is not up to par to the current advances of topics that have emerged in chemistry research and education. (4) Graduate seminars should be a requisite for only one year. (5) Be VERY strict to students on deadlines on their requisites (thesis proposal, graduate seminar + grant proposal, and thesis defense). If a student doesn't finish their Master's degree and Doctor's degree in the time allotted, he or she should be taken out of the program. I recommend a maximum of 3 years for master students and a maximum of 6 years for PhD students. (6) Encourage students to publish their research work. A minimum of 1 paper (first-author) per student is not enough. Maybe re-designing a M.S. and Ph.D thesis to be a sum of research papers would serve both the students and the graduate school well. I believe this practice is done in Europe. I recommend a minimum of 2 publications for master students and a minimum of 4 publications for Ph.D. students.	12/14/2015 4:37 PM
12	. Eliminate the qualifiers or exempt the students who had very good grades in the core courses.	12/14/2015 12:32 PM
13	Es mas fácil obtener una maestría en universidades de renombre en USA. A los estudiantes que entramos al doctorado satisfactoriamente se nos debería proveer una vía más directa para la maestría, tal vez luego de pasar el seminario o la propuesta B. Pienso que el programa es muy old school, y para las herramientas que provee la exigencia es mucha, si lo comparamos nuevamente con instituciones en USA.	12/14/2015 12:12 PM
14	I think the program has a heavy course load. It should be more research oriented	12/14/2015 10:13 AM
15	No elective courses are available for specific areas. Very complicate procedure to take courses out of campus, too many papers and offices.	12/14/2015 9:39 AM
16	For biochemistry students there not options or diversified elective courses. Most of the courses that program offers during the years are related to analytical and organic chemistry. Another aspect are graduate seminars, these cover in majority areas about physical chemistry, nanomaterials, physics topic but for those biochemistry students the seminar offers in this area are less or nule.	12/14/2015 8:09 AM
17	Debería haber un entrenamiento para el uso de equipos presentes en nuestras facilidades, debería haber clases dirigidas al entrenamiento para el uso de estos equipos. Clases laboratorio especializadas en aprender técnicas experimentales.	12/14/2015 8:06 AM
18	Demasiados requisitos para los estudiantes	12/14/2015 12:39 AM
#	Comments for "Research"	Date
1	The university's funding is lacking.	1/21/2016 9:50 AM
2	No comments as never had the opportunity to engage in research	1/19/2016 11:39 PM
3	Great!	1/19/2016 12:45 PM
4	Facilities, purchase orders, storage room, please hire more efficient people in the department.	12/18/2015 12:06 PM
5	Facilities and security are lacking	12/14/2015 9:46 PM
6	Should be more organized.	12/14/2015 12:32 PM
7	Pienso que el mayor problema es la ineficiencia, como lo de las compras que ya mencione o la falta de técnicos que corran ciertos instrumentos. Pero los profesores son muy buenos y en esa parte estoy satisfecho. Incluso puede que muchos sean mejores que en USA.	12/14/2015 12:12 PM
8	It would be better if purchase office would be faster.	12/14/2015 9:39 AM
9	Program needs biochemist professor that perform biochemistry research.	12/14/2015 8:09 AM
#	Comments for "Faculty"	Date
1	Faculty is mostly available if you need anything	1/21/2016 9:50 AM
2	Great!	1/19/2016 12:45 PM
3	There are excellent professors in the program, however as other institutions there are some professors that through their actions show a lack of interest in teaching and mentoring.	1/19/2016 9:52 AM
4	The majority of the faculty lacks on pedagogical skills and develop wrong evaluation and tests. I suggest evaluate the faculty yearly in terms of classes given and as research mentors as well.	12/14/2015 9:46 PM
5	There's a need to be more open to change.	12/14/2015 8:12 PM

6	The faculty should take pedagogic courses and workshops in order to improve their teaching skills. (they are researchers, not teachers)	12/14/2015 12:32 PM
7	Con respecto a la educación estoy feliz, no estoy de acuerdo con la idea de muchos de eliminar los cualificativos. Eso sería una mediocridad, el nivel de exigencia en la selección de estudiantes doctorales es adecuado. Ya de por sí hay un montón de estudiantes malos que logran pasar ese requisito.	12/14/2015 12:12 PM
8	Very competitive, which is good.	12/14/2015 9:39 AM
9	Excelentes profesores, me atrevo a decir que tenemos profesores de excelencia internacional y que nos sirven de ejemplos profesional y personal.	12/14/2015 8:06 AM
10	Problemas internos entre los miembros de la facultad, afectan el desarrollo de experimentos en colaboración de los estudiantes. Los profesores suelen ser subjetivos y a la hora de evaluar carecen de criterios.	12/14/2015 1:08 AM
#	Comments for "Academic rigor (e.g., intellectually challenging)"	Date
1	Absolutely bottom of my list. The academic performance is not measure strictly on the academic ability. There has been a general acceptance to allow academic testing using resources available from previous academic periods. Consequently, academic performance is influence by the availability of this non - class items . This in turn results in the artificial academic performance achievement.	1/19/2016 11:39 PM
2	Great!	1/19/2016 12:45 PM
3	Courses taught at the beginning of graduate studies should be updated, some professors have continue teaching the same class material for many years, not providing the opportunity to students to be familiar with new advancements in chemistry. Moreover, if you teach every year the same, an even worse discuss the same material you give in undergrad courses, few students will be motivated to learn from your class.	1/19/2016 9:52 AM
4	Yearly assessment of students, provide the necessary tools and workshops that can benefit the students.	12/18/2015 12:06 PM
5	Ver area de currículo.	12/14/2015 8:12 PM
6	Although the Proposal B provides a great intellectual challenge, to me, it is the only one. Taken from my comments from the "Curriculum" section I recommend: (1) Provide various short courses to enrich the academic experience of students. Either faculty professor or invited professors (local, national, and international) can enrich the curricula. The courses offered are very limited. (2) The courses offered on the first year to graduate students should be updated. I noticed that professors recycle their same material that they teach for many years. It is not up to par to the current advances of topics that have emerged in chemistry research and education.	12/14/2015 4:37 PM
7	Lo mismo que en la anterior.	12/14/2015 12:12 PM
8	Nos tienen al tanto de la química actual, siempre nos traen nuevos retos y buscan que nos mantengamos al día.	12/14/2015 8:06 AM
#	Comments for "Library resources"	Date
1	The University's scientific database is lacking	1/21/2016 9:50 AM
2	Excellent.. Need to enhance computer resources	1/19/2016 11:39 PM
3	No hay revistas científicas disponibles para estar al día con las últimas publicaciones	1/19/2016 3:04 PM
4	Great!	1/19/2016 12:45 PM
5	We still don't have access to RSC journals, that's unbelievable.	1/19/2016 9:52 AM
6	Sometimes I've come across the issue that the University have not paid the subscription to certain scientific journals and we need a wider variety of journals.	12/15/2015 1:30 PM
7	The library have very limited access to scientific data bases related to chemistry research to the point of slowing the research development.	12/14/2015 9:46 PM
8	Siempre hará falta mas acceso a mas revistas. El sistema compra las revistas basadas en las estadísticas online, pero ¿como esperan tener estadísticas de x o y revista si se esta desilusionado con lo que se encuentra accesible? Es algo que se le debe llevar al sistema de bibliotecas.	12/14/2015 8:12 PM
9	We are still limited relative to universities outside of Puerto Rico.	12/14/2015 4:37 PM
10	They should improve the scientific articles data base.	12/14/2015 12:32 PM
11	Extremadamente malo, no tengo acceso a la mitad de bibliográfica que necesito para mi paper. Incluso he gastado cerca de \$500 en papers. Eso de pedir los paper mediante la biblioteca es otro claro ejemplo de ineficiencia. Hasta algunas universidades privadas en PR tienen más data base que nosotros.	12/14/2015 12:12 PM
12	Imposible to have free access to papers. Very limited access.	12/14/2015 9:39 AM

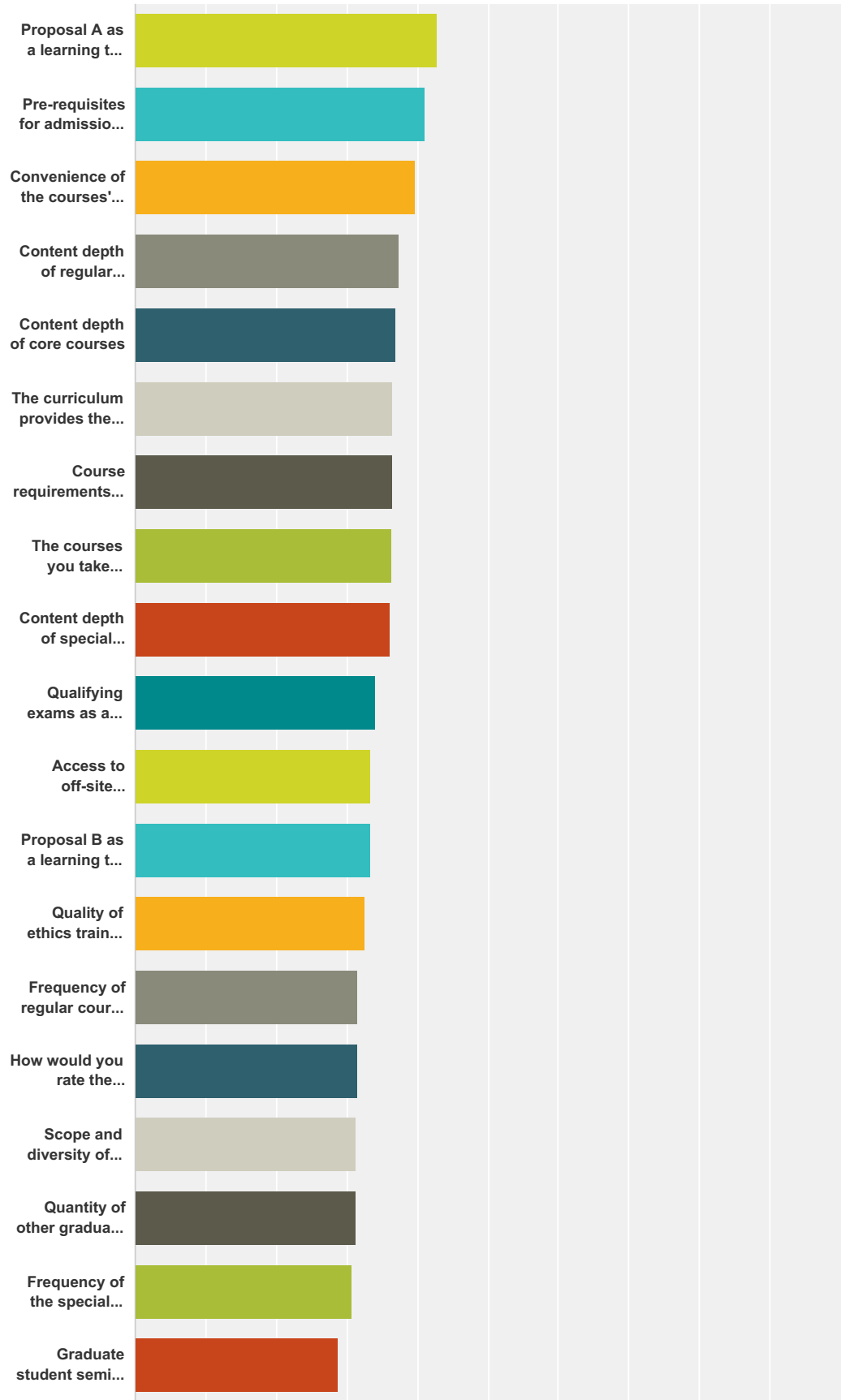
13	No hay mucho, se tardan demasiado en buscarnos las referencias y hay una dejadez por parte de los bibliotecarios. No es consistente su labora, a veces hacen su trabajo rápido y a veces no.	12/14/2015 8:06 AM
#	Comments for "Department physical installations/Research facilities"	Date
1	The FB facilities are really deteriorated. Starting from the entrance to the seminar room, the infrastructure is very old and not well kept. Unfortunately, maintenance workers are not usually seen working.	1/21/2016 9:50 AM
2	Molecular science building	1/20/2016 4:40 PM
3	No hay acceso a los elevadores o alternativas (rampa de impedidos) para personas con impedimentos o accidentadas	1/19/2016 3:04 PM
4	Great!	1/19/2016 12:45 PM
5	El edificio requiere mejoras urgentes: aires acondicionados, iluminacion (seguridad)...	1/19/2016 11:13 AM
6	Most of the research laboratory at Facundo Bueso need urgent repairs, many of us are working in poor safety conditions.	1/19/2016 9:52 AM
7	can improve research labs organization and cleaning in FB	12/28/2015 12:13 PM
8	Some laboratories in FB building are in need of a major remodel.	12/18/2015 12:06 PM
9	The Facundo Bueso building is deficient in infrastructure, security and maintenance of facilities.	12/15/2015 1:30 PM
10	Las instalaciones son las peores.	12/15/2015 12:59 PM
11	There is no security whatsoever especially during the night. Facundo Bueso building doesn't have easy access for handicapped persons (ramps, elevators), there is no nursing facilities for women, there is no adequate ventilation in the hoods, no adequate plumbing, illumination and air conditioner system.	12/14/2015 9:46 PM
12	El departamento debe darle mas apoyo a esos profesores que están comenzando a tener mejores espacios. Pongo de ejemplo a Pasquale pues es un profesor extremadamente inteligente con grandes capacidades pero no tiene su espacio preparado.	12/14/2015 8:12 PM
13	Still needs some aesthetic improvements overall. Most laboratories don't meet the requirements to lab security in general. It should be enforced more.	12/14/2015 4:37 PM
14	THE SECURITY IS THE WORST!! Everybody can enter the building, there is no request ID or keys. Fix the gates and security doors.	12/14/2015 12:32 PM
15	Están mejorando, podría ser mejor, pero entiendo que la situación económica es mala. El MSRB es un ejemplo de los profesores que están comprometidos con el progreso y hacen un excelente trabajo.	12/14/2015 12:12 PM
16	It is not easy to get access to facilities	12/14/2015 10:13 AM
17	Too slow in the remodeling process. Takes the whole semester to remodel one lab and is not finished yet...People in charge need to watch over the contractors to make sure they're doing their job.	12/14/2015 9:39 AM
#	Comments for "Technology (instrumentation, IT, network)"	Date
1	The IT is fair considering the lack of resources the University.	1/21/2016 9:50 AM
2	Poor internet available to graduate student room. Difficult connection or non existence to computer resources.	1/19/2016 11:39 PM
3	No hay WiFi	1/19/2016 3:04 PM
4	Many of the equipment in Facundo Bueso are in bad shape, some of them are damaged and there is no efforts to do something about it	1/19/2016 2:27 PM
5	Great!	1/19/2016 12:45 PM
6	Sometimes it is really difficult to get access to different equipments, which delays our research progress.	1/19/2016 9:52 AM
7	Most the instrumentation needed is in another building where one is not supposed to transport samples in public and making students still transport it to avoid risking getting delayed in the research.	12/14/2015 9:46 PM
8	Fomentar mas el uso de la pagina de facebook. Incluir mas foros para uso de instrumentos entre laboratorios.	12/14/2015 8:12 PM
9	More funding for technical support and additional instrumentations are needed. Of course, I recognize that the MCC and Molecular Biology building has been a great asset to the graduate chemistry program.	12/14/2015 4:37 PM
10	You need your personal computer ur you're lost. No printer available. The photocopier is half of the time broken.	12/14/2015 9:39 AM
11	Deberían orientar mas al estudiantado de la instrumentación presente en nuestra facultad, creo que así podríamos diseñar experimentos de forma mas eficaz.	12/14/2015 8:06 AM

#	Comments for "Academic management (coordination, student orientation, web site, etc.)"	Date
1	I am a 4th year graduate student and the coordination for the Seminar is awful. The web site which provides the rubric is outdated and it is very tedious having to ask professors for the actual rubric instead of being readily available.	1/21/2016 9:50 AM
2	Nobody wants to carry the responsibility. Every time I have had a question no one answers clearly and only send me in circles from administrative to administrative.	1/20/2016 4:40 PM
3	Mala orientacion a los estudiantes de otras instituciones e internacionales.	1/19/2016 3:04 PM
4	Web page should be updated and more user friendly	1/19/2016 9:52 AM
5	Please update the program webpage!! Provide us there with a platform to request meetings with our thesis committee, program director, and workshops to learn how to use the many instruments available to us (students).	12/18/2015 12:06 PM
6	There is a disconnect between what the program wants from you, what your advisor asks you to do, and what the university asks from you.	12/15/2015 1:30 PM
7	There is a huge lack of orientation for grad students in the program. Hopefully with the new program coordinator this will change.	12/14/2015 9:46 PM
8	Web site? there is no graduate program web site, that is a total shame.	12/14/2015 8:12 PM
9	We need more mentoring.	12/14/2015 12:32 PM
#	Comments for "Social environment/Peer group support"	Date
1	The social environment is mostly good although more social activities are needed. The chemistry graduate department should have a sports team like law school and medicine school has or make more social activities in order to better the social environment.	1/21/2016 9:50 AM
2	Great!	1/19/2016 12:45 PM
3	puede mejorar	1/19/2016 11:13 AM
4	Starting this semester, things seems to be improving/changing.	12/18/2015 12:06 PM
5	There is no support available to best of my knowledge.	12/15/2015 1:30 PM
6	It's improving, but there are more important things.	12/14/2015 8:12 PM
7	It is hard to obtain a good social environment when the culture of the students in this program is to be competitive (in a bad way), not support the path the student has chosen in their career and life, and when certain professors communicate in apathy rather than with empathy. I didn't have much support from my peers nor professors. It was very limited. I had to learn who to choose as my support group and the amount of people can be counted with one hand. I believe that promoting an environment where students can interact with each other and with the professor in a friendly fashion can create a healthy environment to work and study. I have been observing improvements of such during this academic year. I recommend the following: (1) Cultural events can help local students communicate more with the international students. (2) I encourage that graduate school should have access to psychologists and counselors to acquire tools to manage graduate school. It is a very challenging period in a student's life. Mental health is important to increase the chances for students to finish their degree and to have better personal/professional relationships with their peers and mentors. (3) Encourage students and professors (through group talks or conferences) to be more accepting and tolerant of diversity. There have been immature attitudes towards students from different religious backgrounds, sexual orientation, and female scientists (specially those who are mothers). From my perspective, as a proud homosexual, I've been subjected to homophobic comments and attitudes (both from LGBT and non-LGBT scientists). I can defend myself just fine, but what about the others that can't? In summary, do we promote a graduate school experience that provides a solid support system in all ways, or do we go through this experience living in a "survival of the fittest" way of life?	12/14/2015 4:37 PM
8	The programs does not promotes sharing between students research ideas. Most of the student are selfish and bad competitors among them.	12/14/2015 12:32 PM
9	No entiendo esta pregunta.	12/14/2015 12:12 PM
10	Todo el mundo esta por su lado, los horarios de actividades no son los mas adecuados.	12/14/2015 8:06 AM
#	Comments for "Funding opportunities"	Date
1	Los fondos son muy limitados y esperan que los estudiantes sean TA toda su vida graduada. Las pocas pecas disponible (RISE, NASA, etc.) son por favoritismo o reputacion del laboratorio donde se trabaja.	1/19/2016 3:04 PM
2	Great!	1/19/2016 12:45 PM
3	Gracias a Dios siempre he tenido beca	1/19/2016 11:13 AM

4	Although there are plenty, many times the amount received is not enough, many students have families to support.	12/18/2015 12:06 PM
5	Some research areas are less funded than others and there are less scholarships available for such areas.	12/15/2015 1:30 PM
6	Hay muy pocas.	12/15/2015 12:59 PM
7	En el pasado eran mejores.	12/14/2015 12:12 PM
8	Some Professors are very active others not so much.	12/14/2015 9:39 AM
9	Deben orientar a los estudiantes de nuevo ingresos de las becas que hay para los primeros 3 años de escuela graduada con GRFP o Ford Foundation, etc.	12/14/2015 8:06 AM
10	Zero	12/14/2015 3:11 AM

Q2 Course Overall Experience

Answered: 34 Skipped: 2



The courses
you take...

	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
Proposal A as a learning tool to facilitate the organization and planning of your thesis project	0.00% 0	3.03% 1	18.18% 6	21.21% 7	48.48% 16	9.09% 3	33	4.27
Pre-requisites for admission (are they enough?)	0.00% 0	3.03% 1	18.18% 6	42.42% 14	36.36% 12	0.00% 0	33	4.12
Convenience of the courses' time schedule	6.25% 2	6.25% 2	9.38% 3	37.50% 12	37.50% 12	3.13% 1	32	3.97
Content depth of regular graduate courses offered after the core courses	6.25% 2	9.38% 3	18.75% 6	28.13% 9	31.25% 10	6.25% 2	32	3.73
Content depth of core courses	6.06% 2	3.03% 1	27.27% 9	30.30% 10	24.24% 8	9.09% 3	33	3.70
The curriculum provides the skills and knowledge needed to succeed in your career	3.03% 1	21.21% 7	15.15% 5	24.24% 8	33.33% 11	3.03% 1	33	3.66
Course requirements to complete degree (number of credits required)	9.09% 3	3.03% 1	27.27% 9	27.27% 9	27.27% 9	6.06% 2	33	3.65
The courses you take prepare you with the necessary skills and knowledge to successfully carry out graduate level research	6.06% 2	21.21% 7	12.12% 4	21.21% 7	36.36% 12	3.03% 1	33	3.63
Content depth of special topics' courses offered after the core courses	6.06% 2	15.15% 5	15.15% 5	30.30% 10	27.27% 9	6.06% 2	33	3.61
Qualifying exams as a measure of the capacity of the student to pursue graduate studies at the doctoral and masters levels.	18.75% 6	15.63% 5	0.00% 0	21.88% 7	34.38% 11	9.38% 3	32	3.41
Access to off-site internships and locations for collaborative research opportunities	15.15% 5	9.09% 3	24.24% 8	18.18% 6	27.27% 9	6.06% 2	33	3.35
Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for your professional career	15.63% 5	12.50% 4	21.88% 7	12.50% 4	31.25% 10	6.25% 2	32	3.33
Quality of ethics training related to chemical research as incorporated in curriculum or in orientation	21.21% 7	12.12% 4	12.12% 4	18.18% 6	30.30% 10	6.06% 2	33	3.26
Frequency of regular courses offered after the core courses	9.09% 3	27.27% 9	18.18% 6	18.18% 6	21.21% 7	6.06% 2	33	3.16
How would you rate the graduate curriculum and curricular experience?	14.71% 5	17.65% 6	23.53% 8	20.59% 7	20.59% 7	2.94% 1	34	3.15
Scope and diversity of graduate courses in the program	15.15% 5	15.15% 5	30.30% 10	15.15% 5	21.21% 7	3.03% 1	33	3.13
Quantity of other graduate program degree requirements	18.75% 6	12.50% 4	28.13% 9	6.25% 2	28.13% 9	6.25% 2	32	3.13
Frequency of the special topic's courses offered after the core courses	12.50% 4	18.75% 6	31.25% 10	12.50% 4	18.75% 6	6.25% 2	32	3.07
Graduate student seminar as a learning tool for problem solving and to conduct independent studies	24.24% 8	15.15% 5	27.27% 9	9.09% 3	21.21% 7	3.03% 1	33	2.88

The courses you take prepare you for writing the thesis	33.33% 11	18.18% 6	9.09% 3	18.18% 6	12.12% 4	9.09% 3	33	2.53
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#	Comments for "How would you rate the graduate curriculum and curricular experience?"	Date
1	More courses are needed.	1/21/2016 9:57 AM
2	Necesita actualizarse para estar a la par con universidades reconocidas	1/19/2016 3:15 PM
3	Hope more teacher speak English and give us e- or paper documents in English about courses.	1/19/2016 1:00 PM
4	via curriculo.	12/21/2015 2:24 AM
5	The curriculum is extremely out-of-date and ends up being repetitive with respect to undergraduate classes. The courses and the requisites are not flexible enough to allow students to learn about specific areas of research that they are interested in and strengthening their knowledge of specific techniques and technologies.	12/20/2015 11:36 AM
6	We need more specialized courses, everything offered so far seems to be more of the same.	12/18/2015 12:29 PM
7	More courses are needed	12/15/2015 1:50 PM
8	There is too many requirements and hasn't been update in years.	12/14/2015 10:01 PM
9	Lo mismo que dije a cerca de la mestria.	12/14/2015 12:17 PM
10	Need to offer more & new courses.	12/14/2015 9:55 AM
11	Me siento preparado en mi área, excelentes cursos.	12/14/2015 8:14 AM
#	Comments for "The curriculum provides the skills and knowledge needed to succeed in your career"	Date
1	Need to enhance computational science in ANtural Science	1/19/2016 11:50 PM
2	El estudiante tiene que bucar por su cuenta cursos e internados para poder mejorar y tener las características para ser elegible luego que se gradua	1/19/2016 3:15 PM
3	Great!	1/19/2016 1:00 PM
4	Para nada, es mas lo que he aprendido con mis companeros de laboratorio que en los cursos referente a como escribir articulos, reviews, como solicitar fondos de beca, como escribir propuesta y seminario.	1/19/2016 11:25 AM
5	Not at all, there is no access to certifications/experiences for industry jobs, nor good preparation for academia positions. I think this can be improved by opening the program to collaboration with other faculties and campuses (right now a special permit is necessary to take any class outside of the program) and allowing the students to participate in internships and teaching experiences of their choosing.	12/20/2015 11:36 AM
6	Although positive for our career improvements, many times our skills improve by experiences acquired abroad and not in our main campus.	12/18/2015 12:29 PM
7	The curriculum doesn't provide for skills and knowledge needed for an industry career. I suggest doing coops/internship partnership with several industrial companies.	12/14/2015 10:01 PM
8	You have to make your own path.	12/14/2015 9:55 AM
9	The classes are not up to date, and we don't have many specialized courses.	12/14/2015 9:41 AM
#	Comments for "The courses you take prepare you with the necessary skills and knowledge to successfully carry out graduate level research"	Date
1	Great!	1/19/2016 1:00 PM
2	Tuve q coger un curso en biologia pq no ofrecian un curso de acuerdo a mi investigacion. Pero todos me ayudaron	1/19/2016 11:25 AM
3	The courses are heavily theoretical. When you start doing research, you start having technical problems that the courses don't prepare you to deal with.	12/20/2015 11:36 AM
4	It is an extension of undergrad courses, nothing new. Let other professors from the program teach new courses or lift the restrictions of taking more courses in other departments.	12/18/2015 12:29 PM
5	Although, more technical and practical courses can be offer. Hands-on workshops on the instruments available.	12/15/2015 1:50 PM
6	No! Los profesores siguen dando las mismas clases que hace muchos años atras.	12/15/2015 1:27 PM
7	Core classes hasn't been updated in years	12/14/2015 10:01 PM
8	Courses are good but we need more variety.	12/14/2015 9:55 AM

9	We don't have any writing classes to prepare us for any written skills (seminar/proposal/papers/thesis).	12/14/2015 9:41 AM
#	Comments for "The courses you take prepare you for writing the thesis"	Date
1	Most of the courses are writing a proposal and giving a presentation of a topic not related to your thesis so no.	1/21/2016 9:57 AM
2	El estudiante escribe y se deja llevar por tesis de sus compañeros para poder ser aceptable. No hay NINGUN curso que te ayude a escribir	1/19/2016 3:15 PM
3	Great!	1/19/2016 1:00 PM
4	There isn't even a general guideline	12/20/2015 11:36 AM
5	One of them did, there should be writing courses offered at least once a year.	12/18/2015 12:29 PM
6	There are no courses available to teach you to write your thesis, you learn from your lab-mates or colleagues.	12/15/2015 1:50 PM
7	Provide courses, short courses, series of webinars, workshops, etc to learn how to write a thesis and prepare for the defense. This can be encouraged after the students has finalized all their graduate school requirements.	12/14/2015 5:19 PM
8	We need a scientific writing course.	12/14/2015 12:40 PM
9	None	12/14/2015 9:55 AM
10	Program do not offers the opportunity to take courses with the objective of learn writing skills in the department. So for next years this would be a good improvement for the curriculum. Department can include a scientific writing course as an elective class.	12/14/2015 8:21 AM
#	Comments for "Scope and diversity of graduate courses in the program"	Date
1	Not many courses.	1/21/2016 9:57 AM
2	Great!	1/19/2016 1:00 PM
3	I think most of the professor have many responsibilities to meet, thus is not an easy task to create a new elective course frequently. An excellent approach would be to bring sabbatical professors to our department, identify the areas where the faculty does not have expertise and bring experts from other universities to give those courses in our university.	1/19/2016 10:39 AM
4	many investigations focused on drugs for cancer treatment (cell's target)	12/28/2015 12:20 PM
5	falta un profesor de computacional graduado y dinámicas de moléculas	12/21/2015 2:24 AM
6	All non-core courses are special topics. They are the same ones since many many years ago, and they are only a few. We end up taking courses we are not at all interested in to cover the course requisites. The older professors are very resistant to innovation on courses.	12/20/2015 11:36 AM
7	Again, we need new topics.	12/18/2015 12:29 PM
8	It can be better	12/15/2015 1:50 PM
9	We need more elective courses.	12/14/2015 12:40 PM
10	See previous questions...	12/14/2015 9:55 AM
11	There not broad alternative of elective courses for biochemistry	12/14/2015 8:21 AM
#	Comments for "Content depth of core courses"	Date
1	Courses are mostly good	1/21/2016 9:57 AM
2	Great!	1/19/2016 1:00 PM
3	The theoretical depth is good. It would be a lot better if all courses included relevant, cutting-edge research papers to the course subjects, or another relevant laboratory experience. The courses should always be tailored to each group's interests. That is the best way to get the most of the professor's experience and knowledge.	12/20/2015 11:36 AM
4	Not much variation there.	12/18/2015 12:29 PM
5	There are courses that need to be updated to the advances made in that chemistry field and there are courses that give so much information that the student is wasting their time and money. A balance is needed. Give a good variety of topics and make sure the student learns it well through different activities (group discussions, articles, going to the facilities and use the instruments, go to research labs and undergo experiments, field trips, etc..)	12/14/2015 5:19 PM
6	Need to go deeper in techniques and experimental design.	12/14/2015 9:55 AM
7	The are not up to date	12/14/2015 9:41 AM

#	Comments for "Content depth of regular graduate courses offered after the core courses"	Date
1	Great!	1/19/2016 1:00 PM
2	Estos cursos me gustaron pq pude elegir los que realmente me podian beneficiar en mi proyecto	1/19/2016 11:25 AM
3	Some of the courses are rigorous and well-planned. Others seem to be put in together at the last minute. Also, none of there are actually regular courses. They are all special courses and are not offered even in a yearly fashion.	12/20/2015 11:36 AM
4	Again, specialized topics.	12/18/2015 12:29 PM
#	Comments for "Frequency of regular courses offered after the core courses"	Date
1	Great!	1/19/2016 1:00 PM
2	It varies, one semester there are various courses, others not so many. Consistency.	12/18/2015 12:29 PM
3	Some courses are not taught for years sometimes.	12/15/2015 1:50 PM
4	Offering various short courses could fix this. You have more options and it fits well to the student's work schedule.	12/14/2015 5:19 PM
5	Too few courses	12/14/2015 9:55 AM
6	The same classes are offered every year with very few exceptions.	12/14/2015 9:41 AM
#	Comments for "Content depth of special topics' courses offered after the core courses"	Date
1	Great!	1/19/2016 1:00 PM
2	The variability here is abysmal. Some have good depth, some don't	12/20/2015 11:36 AM
3	Same suggestion as above.	12/14/2015 5:19 PM
4	These questions are repetitives.	12/14/2015 9:55 AM
#	Comments for "Frequency of the special topic's courses offered after the core courses"	Date
1	Great!	1/19/2016 1:00 PM
2	All the semesters there should be at least one course per specialization area the department offers. A poll before registration could be useful to ensure there's enough students interested in taking the course.	1/19/2016 10:39 AM
3	The problem is not only the frequency, but also the variety. Special topics are supposed to give the professor more flexibility to bring novel research areas and techniques to the classroom. However, the same "special topics" courses have been taught for years and years.	12/20/2015 11:36 AM
4	Open new courses.	12/18/2015 12:29 PM
5	Some courses are not taught for years sometimes.	12/15/2015 1:50 PM
6	Literalmente hay que pedir que ofrezcan cursos.	12/15/2015 1:27 PM
7	Sometimes one have to wait over 2 years for a special topic course.	12/14/2015 10:01 PM
8	These questions are repetitives. Need to improve	12/14/2015 9:55 AM
#	Comments for "Quality of ethics training related to chemical research as incorporated in curriculum or in orientation"	Date
1	Ethics is mostly given at the individual's laboratory.	1/21/2016 9:57 AM
2	The allowance of infringed copies of textbooks is a free ticket to commence plagiarism and other unethical conducts	1/19/2016 11:50 PM
3	Great!	1/19/2016 1:00 PM
4	Se puede dar mas enfasis en practicas eticas dentro de los mismos cursos	1/19/2016 11:25 AM
5	I don't think I have ever received any ethics training from the Chemistry Graduate Program.	12/20/2015 11:36 AM
6	Have not received one.	12/15/2015 1:50 PM
7	I have received none. The solution is to incorporate it into the curriculum. As simple as that.	12/14/2015 5:19 PM
8	I do not know if the department offer this type of course. In my case I already take several training and seminar in this area but as part of my laboratory or other programs requirements.	12/14/2015 8:21 AM
#	Comments for "Access to off-site internships and locations for collaborative research opportunities"	Date
1	All I see is recruitment to transfer to other schools	1/19/2016 11:50 PM

2	Great!	1/19/2016 1:00 PM
3	Provide some credits con validation to students who do an off-site internship.	1/19/2016 10:39 AM
4	This depends only on your PI. I don't think the department has made a concerted effort in this direction.	12/20/2015 11:36 AM
5	Is almost non-existent.	12/14/2015 10:01 PM
6	Of course, this depends on the professor you are working with. There are some that promote this and there are other that are more old-fashioned and non-collaborative.	12/14/2015 5:19 PM
7	You have to figure it out yourself...	12/14/2015 9:55 AM
8	No se promueve mucho.	12/14/2015 8:14 AM
#	Comments for "Course requirements to complete degree (number of credits required)"	Date
1	Great!	1/19/2016 1:00 PM
2	depende del resesarch	12/21/2015 2:24 AM
3	Demasiados creditos.	12/15/2015 1:27 PM
4	Too many! Comparing with other universities along the nation I think the UPR has the most requirements.	12/14/2015 10:01 PM
5	La maestria no debería de requerir tesis para los que entramos al doctorado.	12/14/2015 12:17 PM
6	Compared to other universities we have too many courses required for the first two years, many of them not in your research field.	12/14/2015 9:41 AM
#	Comments for "Quantity of other graduate program degree requirements"	Date
1	Too many requirements for one degree. It takes too long to graduate which promotes drop outs.	1/20/2016 4:49 PM
2	Great!	1/19/2016 1:00 PM
3	Too much	1/19/2016 11:25 AM
4	Too many	12/20/2015 11:36 AM
5	Too many, in comparison with other top universities.	12/18/2015 12:29 PM
6	I don't understand the question	12/15/2015 1:50 PM
7	Need to remake the question, I don't understand...	12/14/2015 9:55 AM
8	Again, too many requirements for the PhD program, to be able to complete within the allowed period of time	12/14/2015 9:41 AM
9	Demasiados requisitos	12/14/2015 12:43 AM
#	Comments for "Pre-requisites for admission (are they enough?) "	Date
1	Apparently, GREG has not been required to the entrance students	1/19/2016 11:50 PM
2	Great!	1/19/2016 1:00 PM
3	The pre-requisites for admission are reasonable. The standards should not be lowered.	12/20/2015 11:36 AM
4	Not enough, but right now we need to focus in atracting people.	12/14/2015 9:55 AM
#	Comments for "Convenience of the courses' time schedule"	Date
1	Hope not have class stat from 1 a.m or 5 p.m. because we will be sleepy and tired.	1/19/2016 1:00 PM
2	There is not option for nocturnal or sabbatical courses, nor less than one semester classes.	12/14/2015 10:01 PM
3	I am not a parent, so I am satisfied with this. But there are graduate students who have children. Although the courses are typically before lunch time, which is good for them, the graduate seminar should be just as early as well. It can be given in lunch time, for example. That can stimulate students to go to lunch together after. Who knows.	12/14/2015 5:19 PM
4	There are no choices, either you are available or you simply cant take the course.	12/14/2015 9:41 AM
#	Comments for "Qualifying exams as a measure of the capacity of the student to pursue graduate studies at the doctoral and masters levels."	Date
1	Most exams repeat material from previous examinations. This results on a totally unfair practice to students choosing to maintain strictly by the material available from existing course term	1/19/2016 11:50 PM
2	Great!	1/19/2016 1:00 PM

3	ver area de currículo.	12/21/2015 2:24 AM
4	They are OK	12/20/2015 11:36 AM
5	I am sure there should be another way to measure the student's capacity to do research.	12/18/2015 12:29 PM
6	I don't think that an exam is a measure of one's knowledge.	12/15/2015 1:50 PM
7	Deberían dar mejor cumes.	12/15/2015 1:27 PM
8	This qualifying exams are develop mostly by faculty who are not trained in the constructions of tests. This test doesn't measure knowledge or capacity of the student to pursue graduate students. They just measure how able is the student to store information.	12/14/2015 10:01 PM
9	I personally think that those exams do not measure at all the capacity of a student to pursue graduate studies at the doctoral and masters levels. It's too old-school. This should be re-invented. Examples are: 1) Give a series of oral presentations of topics taken in the core courses. The student demonstrates its presentation skills, time management, use and management of information, ability to answer questions, etc... This exercise can prepare the student for the subsequent graduate school requirement, the student demonstrates to the professors what he or she learned in their first year, and the student learns more when preparing for the presentation. 2) A series of professors can give an individualized take-home exam to each student to answer a series of questions. Each exam is different, thus plagiarism is avoided. Make questions that require literature search to answer them. Questions that a student can have time to answer them. Of course, this requires stricter evaluation so expectations should be held very high.	12/14/2015 5:19 PM
10	The don't measure your ability to be in either of the programs. One text shouldn't be the only thing to measure one's capacity to earn either a master or doctoral degree.	12/14/2015 9:41 AM
#	Comments for "Graduate student seminar as a learning tool for problem solving and to conduct independent studies"	Date
1	Excessive , lack of refreshments	1/19/2016 11:50 PM
2	Great!	1/19/2016 1:00 PM
3	Tal vez al principio sí son una buen herramienta de aprendizaje pero luego de ir a tantos que no necesariamente se relacionan a tu investigacion se pierde el interes	1/19/2016 11:25 AM
4	I do not know it's the time of the day, the presenters, the subjects, or the students, but most students just don't pay attention, and are just waiting to sign and leave.	12/20/2015 11:36 AM
5	Regular group meetings and independent studies for the student's own research already provides them with this tool. The seminar takes time away from their research.	12/18/2015 12:29 PM
6	Professors should be encouraged to attend to the student's seminars. I find it disrespectful not to attend. Their feedback is valuable. Not all students are evaluated by the same amount of professors and that is unfair. A minimum requirement of 10 professors to grade the seminar is helpful.	12/14/2015 5:19 PM
7	I don't think seminars are giving anything to no one and is expensive to bring people, plus time consuming. This is definitely not working. People don't pay attention to seminars, they are not interested at all. This requirement needs to be changed or modify	12/14/2015 9:55 AM
8	Is a waste of time since most of the professors don't attend your seminar, you only get very few evaluations, and the evaluations are not objective.	12/14/2015 9:41 AM
9	Debe haber un limite de créditos de seminario como requisito, no debe ser hasta que se presente la propuesta b que el estudiante debe asistir a los seminarios.	12/14/2015 8:14 AM
#	Comments for "Proposal A as a learning tool to facilitate the organization and planning of your thesis project"	Date
1	Promote participation in outside lectures to non academic forums	1/19/2016 11:50 PM
2	Great!	1/19/2016 1:00 PM
3	This is a good initial exercise, but the rigorousness of the evaluation varies greatly from committee to committee	12/20/2015 11:36 AM
4	Not yet.	12/14/2015 9:55 AM
#	Comments for "Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for your professional career"	Date
1	Although it does help, it's not necessary.	1/20/2016 4:49 PM
2	I hardly find anyone discussing about practical applications in science.	1/19/2016 11:50 PM
3	Great!	1/19/2016 1:00 PM

4	Aprendi durante el proceso de preparar la propuesta B pero no me beneficia necesariamente ya que no me interesa seguir en la academia. Por lo tanto, en mi caso, es una perdida de tiempo y esfuerzo valioso que podria poner en mis experimentos	1/19/2016 11:25 AM
5	It takes too long to prepare and may not be relevant for all students. Also, what is expected from each students varies too much depending on the discipline and the committee.	12/20/2015 11:36 AM
6	Many already conduct research independently, this is another requirement that takes away time for research. But it is a great practice as students are more experienced and can help them if they are interested in the academia. If they are interested in the industry, there should be an alternate requirement.	12/18/2015 12:29 PM
7	This requirement along with the others the program ask takes too long and takes you away from ones research. This requirement doesn't seem valid for students who want to pursue industry careers.	12/14/2015 10:01 PM
8	It should still be combined with the graduate seminar. With the graduate seminar you have the literature review covered and with the Proposal B, you cover the rest. You can give a 50-60 minute presentation during the graduate seminar time (where you give the literature review and proposal) and then 50-60 minutes alone with the thesis committee defending the proposal. The professors that are not part of your committee that have attended the presentation can grade your presentation and written document and the professors that are part of your thesis committee will grade the same, but with the addition of how well the proposal was defended.	12/14/2015 5:19 PM
9	Not yet	12/14/2015 9:55 AM
10	Esto va a depender, si se quiere continuar en la academia es un requisito altamente enriquecedor pero si no se desea seguir en esta área es un requisito que atrasa al estudiante y no le permite enfocarse en la investigación.	12/14/2015 8:14 AM

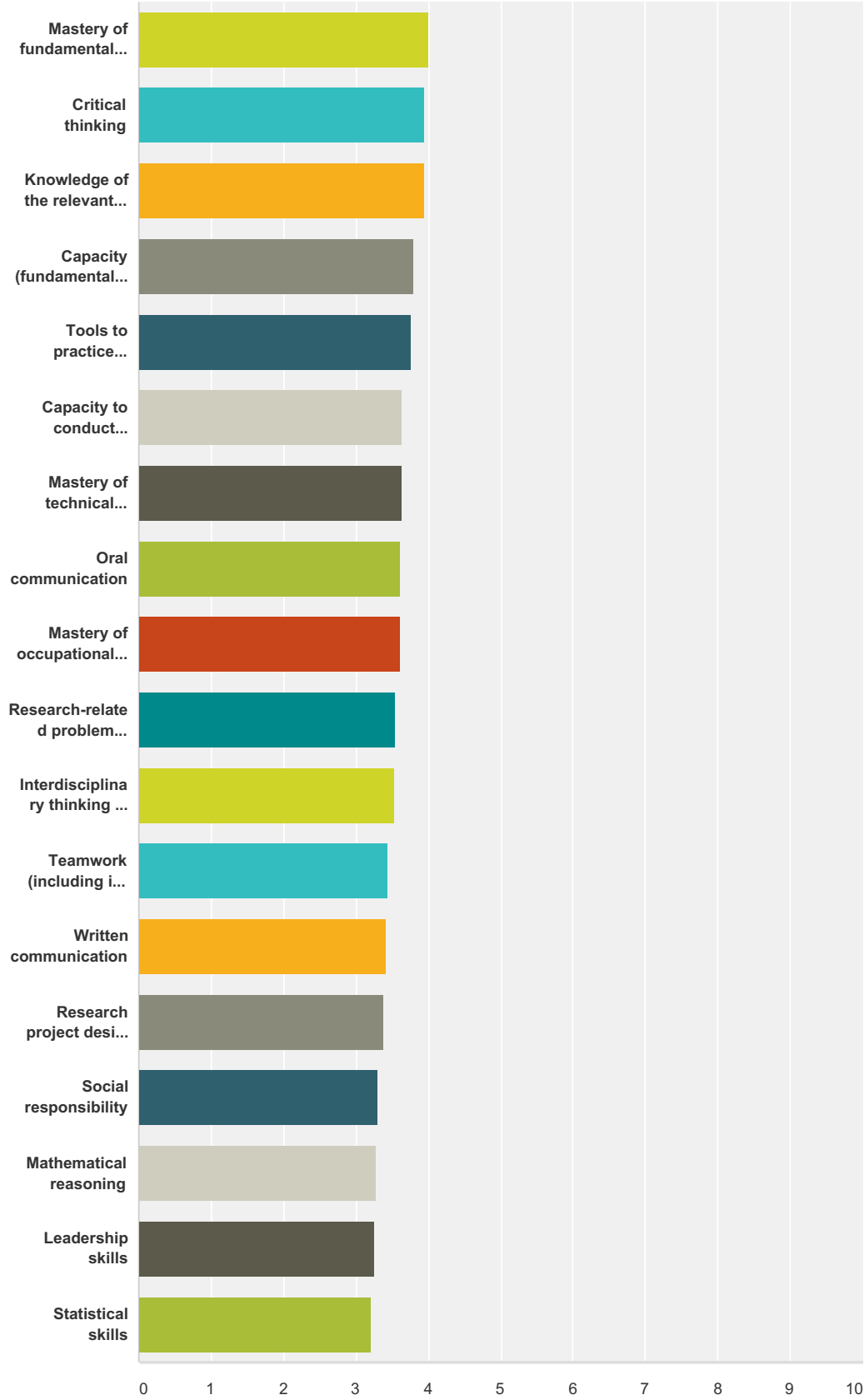
Q3 If you can recommend three to five new courses for the program, what would they be? Explain why and comment, please.

Answered: 14 Skipped: 22

#	Responses	Date
1	Crystallography Transmission Electron Microscopy Proposal Writing Class Industry Related Class Education in Chemistry	1/21/2016 9:57 AM
2	Computer Programing	1/19/2016 11:50 PM
3	Mejoramiento en gramatica en ingles (q incluya vocabulario cientifico) Buen uso de estadistica Buenas tecnicas de presentacion de informacion cientifica al publico no solo cientifico sino tambien general	1/19/2016 11:25 AM
4	CHEMICAL TOOLS FOR BIOLOGY Selected topics in modern chemical biology. The development and application of chemical methods to probe, perturb, and understand biological systems. Topics include protein and DNA chemistry, classical and modern approaches to inhibitor development, and chemical reaction design in living cells. NANOSCIENCE & NANOTECHNOLOGY - An introduction to the basic principles of nanoscience and nanotechnology. Size dependent physical properties of nanoscopic solids will be described using solid state physics and molecular orbital theory as a foundation. Wet chemical techniques that produce nanoscale materials (e.g. carbon nanotubes, semiconductor and metallic nanocrystals, dendrimers...) will be introduced in the second half of the semester. (taken from: https://courses.rice.edu/admweb/!SWKSCAT.cat?p_action=CATALIST&p_acyr_code=2016&p_subj=CHEM)	1/19/2016 10:39 AM
5	scientific writing, develop the necessary skill for research writing.	1/19/2016 9:19 AM
6	1)Bases de química computacional (se necesita en subgraduado al menos como parte del programa, no como electiva) 2) Curso basado en fármacos 3) Curso basado en necesidades en la industria (al menos seminaristas de la industria)	12/21/2015 2:24 AM
7	Data management/Statistics-management of big amount of data, ethical use of data Molecular modeling-software use, basic programming	12/20/2015 11:36 AM
8	1. Instrumentation - There are so many instruments and many of us only use the ones required for our project, it will be great to at least have a basic knowledge on the many instruments available to us students. 2. Nanotechnology - Students from various concentrations can benefit from this course. 3. X-ray crystallography	12/18/2015 12:29 PM
9	Scientific writing for papers, seminar and grant proposals. So that the student can write his/her paper, proposal A or B and his/her seminar with guidance. A course in which the student learn to work hands-on with the necessary equipment for his/her research (IR, NMR, FTIR, TEM, XRD, XPS, etc)	12/15/2015 1:50 PM
10	Coop/Intership Writing course	12/14/2015 10:01 PM
11	Programming Languages - Scientist now are more and more managing "big data" and it would be highly beneficial to learn how to write in Fortran, C, C++, etc... to process large amounts of data, do chemometrics, theoretical analysis through simple models, and make complex plots that can't be done in Excel and Origin, for example. Proposal A - Since it is the first requirement, the student could greatly benefit from the support of a professor. The research mentor is of course involved, but the student can be more focused and pressured to finish the thesis proposal on time. Constant feedback and mentoring during this course will serve the student good and can build confidence in time to handle the rest of the graduate school requirements.	12/14/2015 5:19 PM
12	Cancer research course Drug delivery course Experimental design Scientific writing	12/14/2015 9:55 AM
13	Writing skills Organic synthesis (with up to date information about asymmetric synthesis/modern synthesis, named reactions, mechanisms, etc) Instrumental analysis (with up to date information about new instruments that are most used in the industry and research laboratories) Nanotechnology and solar cells (with up to date information)	12/14/2015 9:41 AM
14	Espectroscopia de masa de proteínas y moléculas biológicas. Escritura de artículos y propuestas científicas. Laboratorio de técnicas, utilizando los equipos de nuestra facilidad.	12/14/2015 8:14 AM

Q4 Capacity building: How would you rate the program in terms of your exposure to activities/courses that allow you to develop the following skills?

Answered: 33 Skipped: 3



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
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Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines	0.00% 0	12.50% 4	12.50% 4	34.38% 11	37.50% 12	3.13% 1	32	4.00
Critical thinking	3.03% 1	3.03% 1	24.24% 8	33.33% 11	33.33% 11	3.03% 1	33	3.94
Knowledge of the relevant scientific literature and the ability to use it in problem solving	3.03% 1	12.12% 4	9.09% 3	36.36% 12	36.36% 12	3.03% 1	33	3.94
Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry	3.03% 1	9.09% 3	15.15% 5	45.45% 15	24.24% 8	3.03% 1	33	3.81
Tools to practice ethical conduct on your professional career	3.03% 1	12.12% 4	18.18% 6	36.36% 12	27.27% 9	3.03% 1	33	3.75
Capacity to conduct independent research	6.25% 2	12.50% 4	21.88% 7	31.25% 10	28.13% 9	0.00% 0	32	3.63
Mastery of technical skills required for a chemical professional	3.03% 1	12.12% 4	27.27% 9	30.30% 10	24.24% 8	3.03% 1	33	3.63
Oral communication	6.06% 2	15.15% 5	18.18% 6	33.33% 11	27.27% 9	0.00% 0	33	3.61
Mastery of occupational safety and security laws, and environmental protection regulations	6.06% 2	9.09% 3	27.27% 9	33.33% 11	24.24% 8	0.00% 0	33	3.61
Research-related problem solving	6.06% 2	12.12% 4	30.30% 10	24.24% 8	27.27% 9	0.00% 0	33	3.55
Interdisciplinary thinking and knowledge	6.06% 2	12.12% 4	27.27% 9	27.27% 9	24.24% 8	3.03% 1	33	3.53
Teamwork (including in diversity scenarios)	9.09% 3	15.15% 5	18.18% 6	36.36% 12	21.21% 7	0.00% 0	33	3.45
Written communication	9.09% 3	15.15% 5	24.24% 8	27.27% 9	24.24% 8	0.00% 0	33	3.42
Research project design and development	6.06% 2	24.24% 8	15.15% 5	33.33% 11	21.21% 7	0.00% 0	33	3.39
Social responsibility	9.09% 3	18.18% 6	24.24% 8	30.30% 10	18.18% 6	0.00% 0	33	3.30
Mathematical reasoning	9.09% 3	18.18% 6	27.27% 9	21.21% 7	21.21% 7	3.03% 1	33	3.28
Leadership skills	6.06% 2	21.21% 7	27.27% 9	27.27% 9	15.15% 5	3.03% 1	33	3.25
Statistical skills	6.06% 2	27.27% 9	27.27% 9	12.12% 4	24.24% 8	3.03% 1	33	3.22

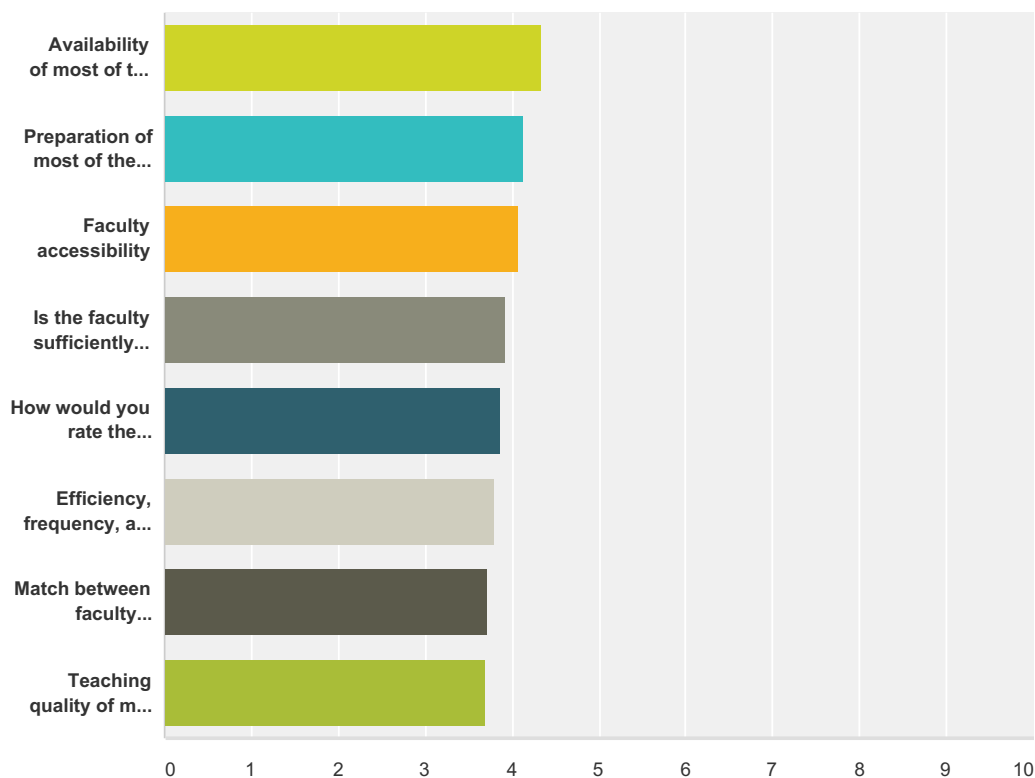
#	Comments for "Written communication"	Date
1	Hope to know the evaluations of our paper.	1/19/2016 1:00 PM
2	Scientific writing course.	12/18/2015 12:29 PM
3	No courses available	12/15/2015 1:50 PM
4	We don't have any.	12/14/2015 9:41 AM
#	Comments for "Oral communication"	Date
1	Oral communication is mostly done at the individual's laboratory.	1/21/2016 9:57 AM
2	A yearly data meeting would help	12/20/2015 11:36 AM
3	The program should offer a international English course.	12/14/2015 12:40 PM

4	Can improve	12/14/2015 9:55 AM
5	Is up to the student is you want to participate in oral presentations, therefore, is not a requisite.	12/14/2015 9:41 AM
#	Comments for "Research project design and development"	Date
1	Esto lo desarrolle en el laboratorio	1/19/2016 11:25 AM
2	No guidance available	12/15/2015 1:50 PM
3	The program delegate too much in the student, instead of guide it with requirements and/or courses.	12/14/2015 12:40 PM
4	Should be a course for this	12/14/2015 9:55 AM
5	There are not many opportunities in the departament.	12/14/2015 9:41 AM
#	Comments for "Capacity to conduct independent research"	Date
1	Lo desarrolle en el laboratorio	1/19/2016 11:25 AM
2	What are we calling independent research? We are not independent researches, we go under an umbrella who is the professor.	12/21/2015 2:24 AM
3	More guidance is needed.	12/15/2015 1:50 PM
4	A course need to be offer rush. Otherwise you learn by mistakes and it takes much more time. People ends graduating after 7 years!!!	12/14/2015 9:55 AM
#	Comments for "Research-related problem solving"	Date
1	We end up learning to solve complex research problems, but since we are mostly on our own, it takes a long time.	12/20/2015 11:36 AM
2	You learn on your own	12/15/2015 1:50 PM
3	That is individual	12/14/2015 9:55 AM
#	Comments for "Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines"	Date
1	Depends if the prof. uses research articles in class.	12/21/2015 2:24 AM
#	Comments for "Teamwork (including in diversity scenarios)"	Date
1	There is not enough collaboration between different labs in the department	12/20/2015 11:36 AM
2	Sometimes there is no team work among different laboratories.	12/14/2015 10:01 PM
3	Need to improve	12/14/2015 9:55 AM
4	Depends on the lab you are working.	12/14/2015 9:41 AM
#	Comments for "Interdisciplinary thinking and knowledge"	Date
1	Again, collaborating with labs of other disciplines may improve this	12/20/2015 11:36 AM
2	Depends on the lab you are working.	12/14/2015 9:41 AM
#	Comments for "Critical thinking"	Date
1	Depends on the lab you are working.	12/14/2015 9:41 AM
#	Comments for "Social responsibility"	Date
1	The program itself never gets involved in anything like this, nor is it discussed in courses	12/20/2015 11:36 AM
2	More involvement and compromise of professors, inspiring their students to do the same.	12/18/2015 12:29 PM
3	We all need to involve more.	12/14/2015 9:55 AM
#	Comments for "Leadership skills"	Date
	There are no responses.	
#	Comments for "Mathematical reasoning"	Date
1	Specialized courses.	12/18/2015 12:29 PM
2	None (but it depends on you research if you need it or not).	12/14/2015 9:41 AM
#	Comments for "Statistical skills"	Date
1	Never had good statistics training, apart from what I learned in undergraduate analytical chemistry	12/20/2015 11:36 AM

2	Specialized courses.	12/18/2015 12:29 PM
3	Depends on your research if you need it or not.	12/14/2015 9:41 AM
4	We learned this in the laboratory as part of our experience as researcher. Program could explore the possibility to offers workshop in this area for the benefit of students.	12/14/2015 8:21 AM
#	Comments for "Mastery of occupational safety and security laws, and environmental protection regulations"	Date
1	Some training is provided during the TA experience, and the students rarely attend an OPASO training	12/20/2015 11:36 AM
#	Comments for "Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry"	Date
1	Research.	12/21/2015 2:24 AM
2	...after many years	12/20/2015 11:36 AM
3	More workshops.	12/18/2015 12:29 PM
4	You learn on your own	12/15/2015 1:50 PM
5	Técnico no mucho.	12/14/2015 8:14 AM
#	Comments for "Knowledge of the relevant scientific literature and the ability to use it in problem solving"	Date
1	To have this knowledge one must have access to this literature and we don't have it.	12/14/2015 10:01 PM
#	Comments for "Mastery of technical skills required for a chemical professional"	Date
1	It would help to have more instruments courses available regularly and more access to them.	1/20/2016 4:49 PM
2	It is very hard for a student to learn to use an instrument that is not available in his/her lab. Short courses and certifications on techniques and instruments should be available.	12/20/2015 11:36 AM
3	More workshops.	12/18/2015 12:29 PM
#	Comments for "Tools to practice ethical conduct on your professional career"	Date
1	victim from unethical practice of a coordinator	1/19/2016 11:50 PM
2	Ethics are rarely discussed in the Chemistry department. Biology does a far better job at this.	12/20/2015 11:36 AM

Q5 Part C. (1) Faculty

Answered: 31 Skipped: 5



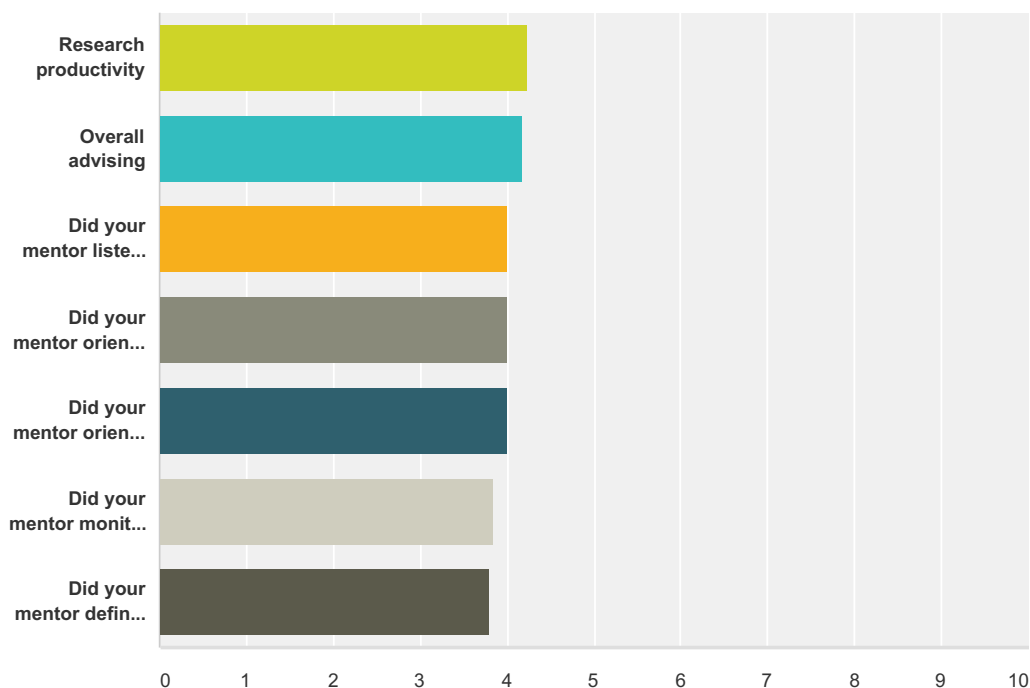
	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
Availability of most of the professors to receive students in their office hours	0.00% 0	0.00% 0	10.00% 3	43.33% 13	43.33% 13	3.33% 1	30	4.34
Preparation of most of the professors	0.00% 0	0.00% 0	20.00% 6	46.67% 14	33.33% 10	0.00% 0	30	4.13
Faculty accessibility	0.00% 0	6.67% 2	13.33% 4	43.33% 13	33.33% 10	3.33% 1	30	4.07
Is the faculty sufficiently diverse as to advise students in regard to different research aspects related to their thesis project?	0.00% 0	6.67% 2	23.33% 7	36.67% 11	30.00% 9	3.33% 1	30	3.93
How would you rate the graduate faculty overall?	0.00% 0	12.90% 4	16.13% 5	41.94% 13	29.03% 9	0.00% 0	31	3.87
Efficiency, frequency, and clarity in reporting student's academic progress during the course	6.67% 2	3.33% 1	23.33% 7	36.67% 11	30.00% 9	0.00% 0	30	3.80
Match between faculty expertise and course offerings	3.33% 1	10.00% 3	23.33% 7	33.33% 10	26.67% 8	3.33% 1	30	3.72
Teaching quality of most of the professors	6.67% 2	6.67% 2	23.33% 7	36.67% 11	26.67% 8	0.00% 0	30	3.70

#	Comments for "How would you rate the graduate faculty overall?"	Date
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1	They are generally resistant to change and are too lazy to go through the trouble of updating or creating new courses, updating the requisites, looking for collaborations, and improving their mentoring. Also, some don't even bother in writing proposals to get funding, which is absolutely essential for our program.	12/20/2015 11:41 AM
2	We expect more from some professors that are absent from seminars or activities.	12/18/2015 12:34 PM
3	Depende del profesor	12/15/2015 1:37 PM
4	Algunos no tienen grandes ni publican frecuentemente.	12/14/2015 12:20 PM
#	Comments for "Preparation of most of the professors"	Date
1	can be complement with teaching techniques	12/28/2015 12:21 PM
#	Comments for "Match between faculty expertise and course offerings"	Date
	There are no responses.	
#	Comments for "Teaching quality of most of the professors"	Date
1	The faculty is not pedagogically trained and that translates in very deficient teaching skills.	12/14/2015 10:02 PM
2	Most of them give the same class year after year (for the last >20 years)	12/14/2015 9:43 AM
#	Comments for "Faculty accessibility"	Date
	There are no responses.	
#	Comments for "Availability of most of the professors to receive students in their office hours"	Date
1	It depends on the professor	1/21/2016 9:58 AM
#	Comments for "Efficiency, frequency, and clarity in reporting student's academic progress during the course"	Date
1	Algunos ni califican los exámenes, no se como ponen las notas.	12/14/2015 12:20 PM
2	Depends on the professor	12/14/2015 9:43 AM
3	Hay una gran dejadez en este aspecto, esto afecta mucho a los becados porque en los cursos modulares no se toma muy en serio el reporte de notas. Hay veces que los estudiantes esperan una nota y reciben otra porque nunca les entregaron las notas o solo se las mencionaron y nunca vieron sus exámenes. Esto me ha pasado en lo personal, pero muchos estudiantes también han pasado por lo mismo y sin ver los exámenes no se puede reclamar nada.	12/14/2015 8:18 AM
#	Comments for "Is the faculty sufficiently diverse as to advise students in regard to different research aspects related to their thesis project?"	Date
	There are no responses.	

Q6 Part C. (2) Mentor

Answered: 29 Skipped: 7



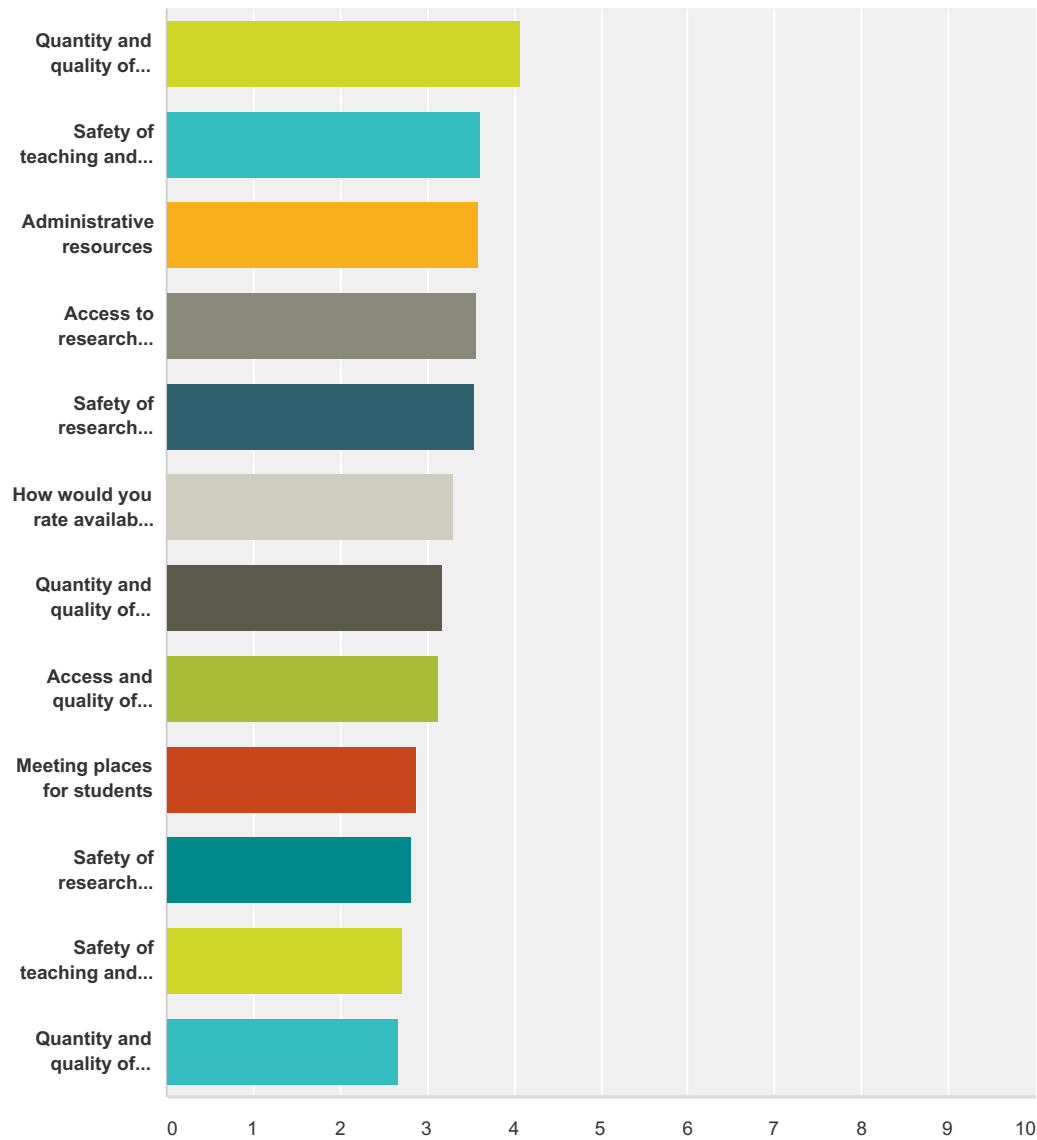
	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
Research productivity	3.45% 1	6.90% 2	3.45% 1	34.48% 10	51.72% 15	0.00% 0	29	4.24
Overall advising	3.45% 1	10.34% 3	3.45% 1	31.03% 9	51.72% 15	0.00% 0	29	4.17
Did your mentor listen, give, and receive feedback, and respond perceptively to your questions?	6.90% 2	10.34% 3	6.90% 2	24.14% 7	48.28% 14	3.45% 1	29	4.00
Did your mentor orient you about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?	3.45% 1	6.90% 2	17.24% 5	24.14% 7	41.38% 12	6.90% 2	29	4.00
Did your mentor orient you about relevant health and safety issues in the laboratory and demonstrate responsible working practices?	0.00% 0	17.24% 5	10.34% 3	20.69% 6	44.83% 13	6.90% 2	29	4.00
Did your mentor monitor, document, reflect, and report on your progress?	7.14% 2	10.71% 3	10.71% 3	25.00% 7	39.29% 11	7.14% 2	28	3.85
Did your mentor define a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?	10.34% 3	6.90% 2	20.69% 6	17.24% 5	44.83% 13	0.00% 0	29	3.79

#	Comments for "Overall advising"	Date
1	My experience was very bad.	12/15/2015 1:54 PM
#	Comments for "Research productivity"	Date
1	With no feedback from the mentor is almost impossible to advance in the research.	12/15/2015 1:54 PM

#	Comments for "Did your mentor define a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?"	Date
1	No, he did not. He made a great plan but difficult to follow and with no training.	12/15/2015 1:54 PM
#	Comments for "Did your mentor listen, give, and receive feedback, and respond perceptively to your questions?"	Date
1	His feedback was to try again, work harder.	12/15/2015 1:54 PM
2	Can improve. Need to be a little more understanding	12/14/2015 9:57 AM
#	Comments for "Did your mentor orient you about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?"	Date
1	Can teach us in one of the weekly lab meetings.	12/14/2015 5:22 PM
#	Comments for "Did your mentor orient you about relevant health and safety issues in the laboratory and demonstrate responsible working practices?"	Date
	There are no responses.	
#	Comments for "Did your mentor monitor, document, reflect, and report on your progress?"	Date
	There are no responses.	

Q7 Essential resources for faculty, teaching, productivity, and research

Answered: 28 Skipped: 8



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
Quantity and quality of off-campus research facilities (Molecular Sciences Building)	0.00% 0	3.57% 1	14.29% 4	53.57% 15	28.57% 8	28	4.07
Safety of teaching and studying facilities from 8:00 am to 5:00 pm	7.14% 2	10.71% 3	10.71% 3	57.14% 16	14.29% 4	28	3.61
Administrative resources	3.70% 1	11.11% 3	22.22% 6	48.15% 13	14.81% 4	27	3.59
Access to research facilities	3.57% 1	10.71% 3	25.00% 7	46.43% 13	14.29% 4	28	3.57
Safety of research facilities from 8:00 am to 5:00 pm	10.71% 3	7.14% 2	10.71% 3	60.71% 17	10.71% 3	28	3.54

How would you rate available resources for teaching and research by faculty and students?	14.81% 4	7.41% 2	22.22% 6	44.44% 12	11.11% 3	27	3.30
Quantity and quality of research laboratories	14.29% 4	7.14% 2	39.29% 11	25.00% 7	14.29% 4	28	3.18
Access and quality of office/working space for students	17.86% 5	10.71% 3	21.43% 6	39.29% 11	10.71% 3	28	3.14
Meeting places for students	17.86% 5	17.86% 5	28.57% 8	28.57% 8	7.14% 2	28	2.89
Safety of research facilities during night	28.57% 8	14.29% 4	10.71% 3	39.29% 11	7.14% 2	28	2.82
Safety of teaching and studying facilities during night	28.57% 8	14.29% 4	21.43% 6	28.57% 8	7.14% 2	28	2.71
Quantity and quality of classrooms	28.57% 8	17.86% 5	17.86% 5	28.57% 8	7.14% 2	28	2.68

#	Comments for "How would you rate available resources for teaching and research by faculty and students?"	Date
1	We	1/19/2016 10:59 AM
2	I don't understand the question	12/15/2015 1:58 PM
3	Scarce resources	12/14/2015 10:03 AM
#	Comments for "Safety of teaching and studying facilities from 8:00 am to 5:00 pm"	Date
1	We need more security guards in the building, this building is not safe.	12/18/2015 12:41 PM
2	There is no security! We don't feel safe even during the daytime	12/14/2015 10:05 PM
3	THE BUILDING SECURITY AND RESOURCES ARE TERRIBLE.	12/14/2015 12:52 PM
#	Comments for "Safety of research facilities from 8:00 am to 5:00 pm"	Date
1	El guardia de seghuridad duerme mucho	1/19/2016 3:19 PM
2	We need more security guards in the building, this building is not safe.	12/18/2015 12:41 PM
3	No hay seguridad	12/15/2015 1:52 PM
4	THE BUILDING SECURITY AND RESOURCES ARE TERRIBLE.	12/14/2015 12:52 PM
5	Need to improve	12/14/2015 10:03 AM
#	Comments for "Safety of teaching and studying facilities during night"	Date
1	It's safe before midnight, but dangerous after that	1/19/2016 3:58 PM
2	some areas are lonely and somehow dark	12/28/2015 12:27 PM
3	We need more security guards in the building, this building is not safe.	12/18/2015 12:41 PM
4	almost no safety. No security guard and easy access to people from outside campus.	12/15/2015 1:58 PM
5	De noche mucho menos	12/15/2015 1:52 PM
6	Considering the location of the university campus, it requires the involvement of entities outside the graduate school program to help with this.	12/14/2015 5:27 PM
7	THE BUILDING SECURITY AND RESOURCES ARE TERRIBLE.	12/14/2015 12:52 PM
8	Trolley is needed overnight	12/14/2015 10:03 AM
#	Comments for "Safety of research facilities during night"	Date
1	No hay seguridad en la noche	1/19/2016 3:19 PM
2	some areas are lonely and somehow dark	12/28/2015 12:27 PM
3	In the Facundo Bueso Building it is very dark, the security doors are broken, and anyone can get in from the back of the building. The MSRB is very safe always.	12/20/2015 11:56 AM
4	We need more security guards in the building, this building is not safe.	12/18/2015 12:41 PM

5	almost no safety. No security guard and easy access to people from outside campus.	12/15/2015 1:58 PM
6	No existe seguridad en ningún momento del día	12/15/2015 1:52 PM
7	There has been many robberies	12/14/2015 10:05 PM
8	Same comment as above.	12/14/2015 5:27 PM
9	THE BUILDING SECURITY AND RESOURCES ARE TERRIBLE.	12/14/2015 12:52 PM
#	Comments for "Quantity and quality of classrooms"	Date
1	Hay un solo salon en todo el edificio para tomar clases.	1/19/2016 3:19 PM
2	We should at least have basic materials, such as erasers, markers in the classroom.	1/19/2016 10:59 AM
3	can add one more classroom	12/28/2015 12:27 PM
4	There is only one classroom, but I don't think we actually need more.	12/20/2015 11:56 AM
5	Just one classroom!	12/15/2015 1:58 PM
6	Solo hay un salón de clases.	12/15/2015 1:52 PM
7	JUST ONE CLASSROOM	12/14/2015 12:52 PM
8	Only one!!!	12/14/2015 10:03 AM
9	There is only ONE teaching classroom in FB	12/14/2015 9:46 AM
10	In the department we just only have a classroom.	12/14/2015 8:27 AM
#	Comments for "Quantity and quality of research laboratories"	Date
1	Some laboratories need remodeling.	12/18/2015 12:41 PM
2	La calidad es pésima.	12/15/2015 1:52 PM
3	The labs are obsolete.	12/14/2015 12:52 PM
4	In my consideration department need more available biochemistry laboratories and faculty in these are to more alternatives for those students who want to complete a Chemistry PhD. in biochemistry area.	12/14/2015 8:27 AM
#	Comments for "Quantity and quality of off-campus research facilities (Molecular Sciences Building)"	Date
1	The MSRB has many facilities, but many instruments were removed from FB, making it harder for those who work mostly on FB	12/20/2015 11:56 AM
2	Es perfecto para los que tienen acceso y trabajan allí.	12/15/2015 1:52 PM
3	It is in good condition due to it is relatively new building.	12/14/2015 12:52 PM
4	Not everybody is allowed to do research in that building.	12/14/2015 9:46 AM
#	Comments for "Meeting places for students"	Date
1	No existen	1/19/2016 3:19 PM
2	an improve cleaning and appearance of second floor benches of the common area. Also can work to control the mosquitoes.	12/28/2015 12:27 PM
3	If would be better if we had an actual meeting space that could also double as a multimedia room	12/20/2015 11:56 AM
4	The lobby? We should have a room with microwave and tables to foment more networking opportunities.	12/18/2015 12:41 PM
5	Almost none if not for your own research laboratory.	12/15/2015 1:58 PM
6	No existe.	12/15/2015 1:52 PM
7	THERE IS NO PLACE FOR STUDENT MEETINGS.	12/14/2015 12:52 PM
8	We don't have that.	12/14/2015 9:46 AM
9	No hay mucho, debería haber una facilidad que la medio día puedan los estudiantes calentar comida e interactuar mientras comen con sus compañeros y profesores.	12/14/2015 8:21 AM
#	Comments for "Access to research facilities"	Date
1	Sometimes some of the labs reserve all the time for an instrument a you have to wait for weeks	12/20/2015 11:56 AM
#	Comments for "Access and quality of office/working space for students "	Date

1	No existe	1/19/2016 3:19 PM
2	no public common space.	12/28/2015 12:27 PM
3	That depends on the lab, but it is generally ok	12/20/2015 11:56 AM
4	No space	12/14/2015 10:03 AM
#	Comments for "Administrative resources"	Date
1	can improve working hour to have access.	12/28/2015 12:27 PM
2	The administration is extremely deficient in terms of purchasing orders processing	12/20/2015 11:56 AM
3	New personnel.	12/18/2015 12:41 PM
4	Wilma and Aida work very good, they do almost everything.	12/14/2015 12:52 PM
5	No resources	12/14/2015 10:03 AM

Q8 Which recommendations can you give to improve the student experience in the graduate program?

Answered: 7 Skipped: 29

#	Responses	Date
1	Hope to have more party can talk with other graduate students.	1/19/2016 1:05 PM
2	Professors should keep in mind the impact they can have in their students. Personal matters should be put aside, and work together to contribute to the academic community, but most importantly to Puerto Rico Society. The creation of excellent and visionary professionals relies many times upon the faculty development.	1/19/2016 10:59 AM
3	The professors have to commit to do more effective mentoring, and the students need to keep up with the department requirements in a timely manner	12/20/2015 11:56 AM
4	Yearly in depth orientation of the programs and the requirements, yearly assessment with the program coordinator of the student's progress.	12/18/2015 12:41 PM
5	More classroom and areas to study. More security. Secure the access doors of the building. Maybe security cameras.	12/15/2015 1:58 PM
6	Que mejores las facilidades.	12/15/2015 1:52 PM
7	Trolly 24/7 A computer center 24/7 or a room where you can have access or separate it for study. Printer facility. A program of after school for students that are also parents.	12/14/2015 10:03 AM

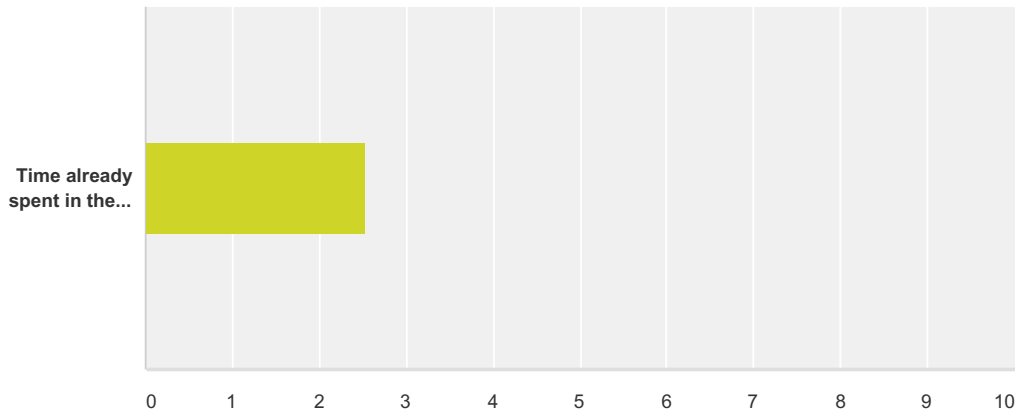
Q9 What modifications, if any, would you suggest to enrich the curriculum?

Answered: 4 Skipped: 32

#	Responses	Date
1	The program should motivate students to have an entrepreneur mind, there's not enough positions in academia, most of us will probably have to work in an every year contract. Classes, proposal A & B should have an special focus in the creation of new small research businesses. Introduce courses and webinars with an special focus in proposals writing for federal grants or other type of grants.	1/19/2016 10:59 AM
2	Collaboration and flexibilyzing the curriculum so the students can tailor them to their interests (courses in other departments/campuses, internships, COOPs)	12/20/2015 11:56 AM
3	More courses and less restrictions.	12/18/2015 12:41 PM
4	Definetely increase academic offer. New courses	12/14/2015 10:03 AM

Q10 Demographic profile

Answered: 27 Skipped: 9

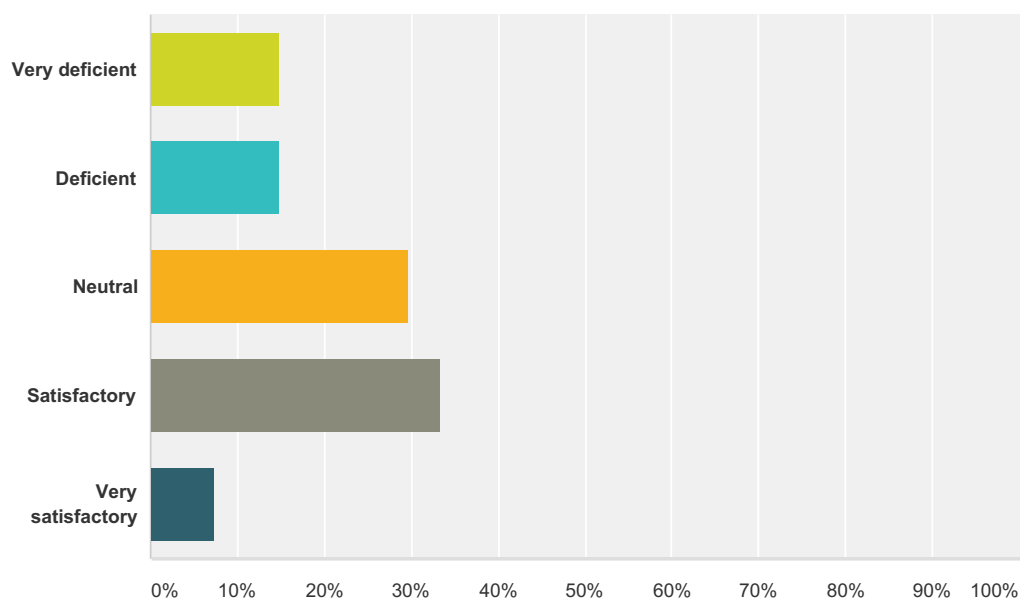


	0-2 years	3-4 years	5-6 years	7-8 years	9 or more years	Total	Weighted Average
Time already spent in the Chemistry Graduate Program	18.52% 5	33.33% 9	29.63% 8	14.81% 4	3.70% 1	27	2.52

#	comments	Date
1	I have just recently changed research advisor and thesis topic.	12/15/2015 2:00 PM

Q11 The time being spent to complete the degree is

Answered: 27 Skipped: 9

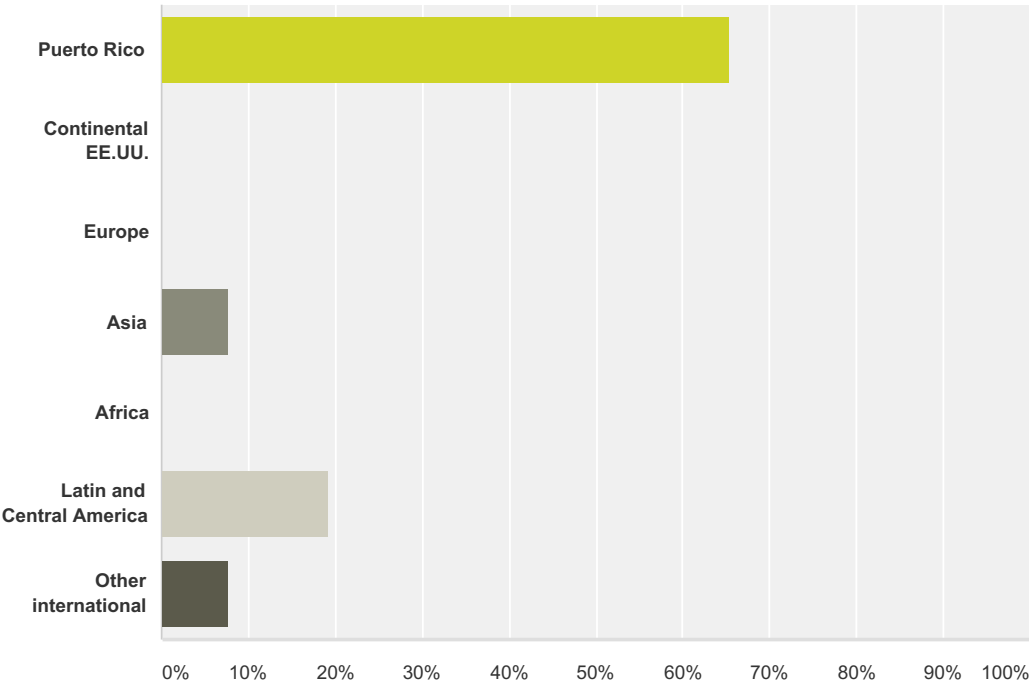


Answer Choices	Responses
Very deficient	14.81% 4
Deficient	14.81% 4
Neutral	29.63% 8
Satisfactory	33.33% 9
Very satisfactory	7.41% 2
Total	27

#	Please explain the particular circumstances.	Date
1	The selection of a good mentor is key in this one.	12/15/2015 2:00 PM
2	The amount of graduate school requirements and the type of research work that I got involved in. I will finish next summer, which totals to 7.5 years in the program. I do no regret how I pursued by graduate studies and research work because I have learned so much and grown as a person and as an adult. Still, it would have been nice to have finished in 6 years rather than 7.5	12/14/2015 5:31 PM
3	I was accepted in the program in 2010, however because I could take three exams at the end of the first year I could not begin with my research project and complete my proposal A requirement at the second year. In 2011-2012 I joined my lab and started to work in a research area, however due to some circumstances with the project limitations, results and progress my mentor decide to change some project aim and focus in other direction in terms of the research in 2013-2014. As a result we changed the proposal A, and continue with other project. Actually we had been working for one year and a half in this project and we already completed aim 1,2,3. So in my opinion without situations like the above mentioned a student can complete a PhD. in approximately 4-5 years.	12/14/2015 8:50 AM

Q12 Place of origin

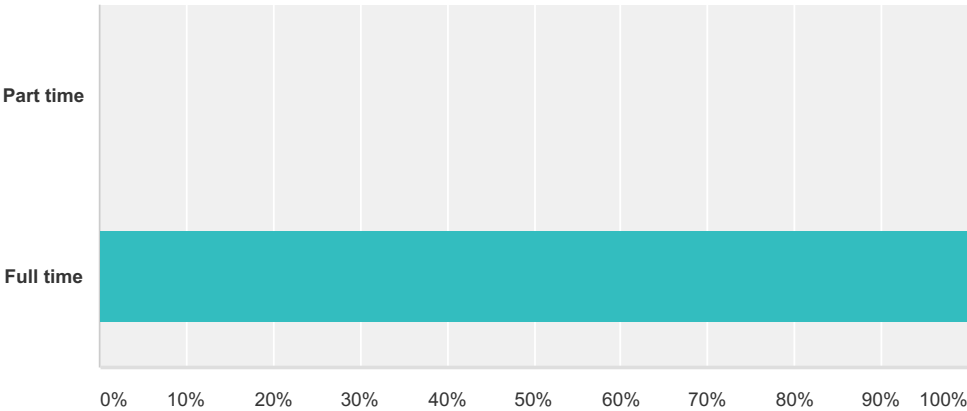
Answered: 26 Skipped: 10



Answer Choices	Responses	
Puerto Rico	65.38%	17
Continental EE.UU.	0.00%	0
Europe	0.00%	0
Asia	7.69%	2
Africa	0.00%	0
Latin and Central America	19.23%	5
Other international	7.69%	2
Total		26

Q13 You are studying

Answered: 27 Skipped: 9

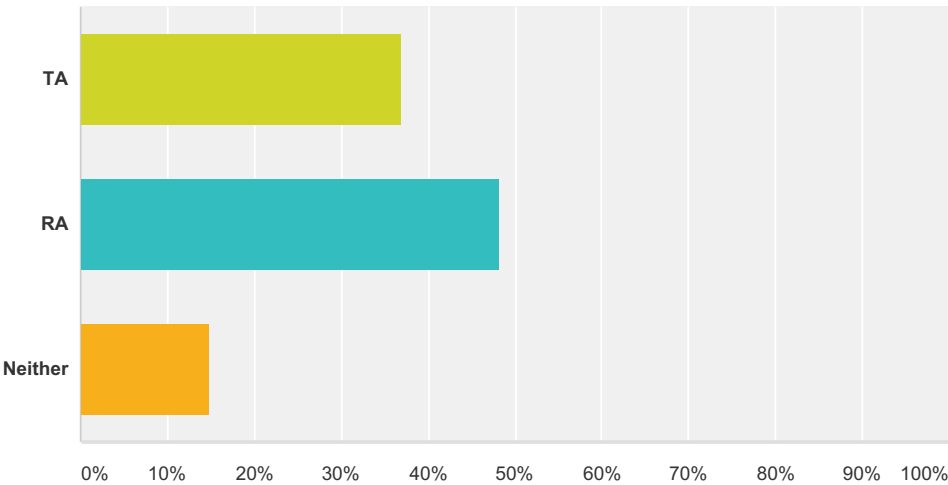


Answer Choices	Responses
Part time	0.00%0
Full time	100.00%27
Total	27

#	If part time, why?	Date
	There are no responses.	

Q14 TA or RA status

Answered: 27 Skipped: 9

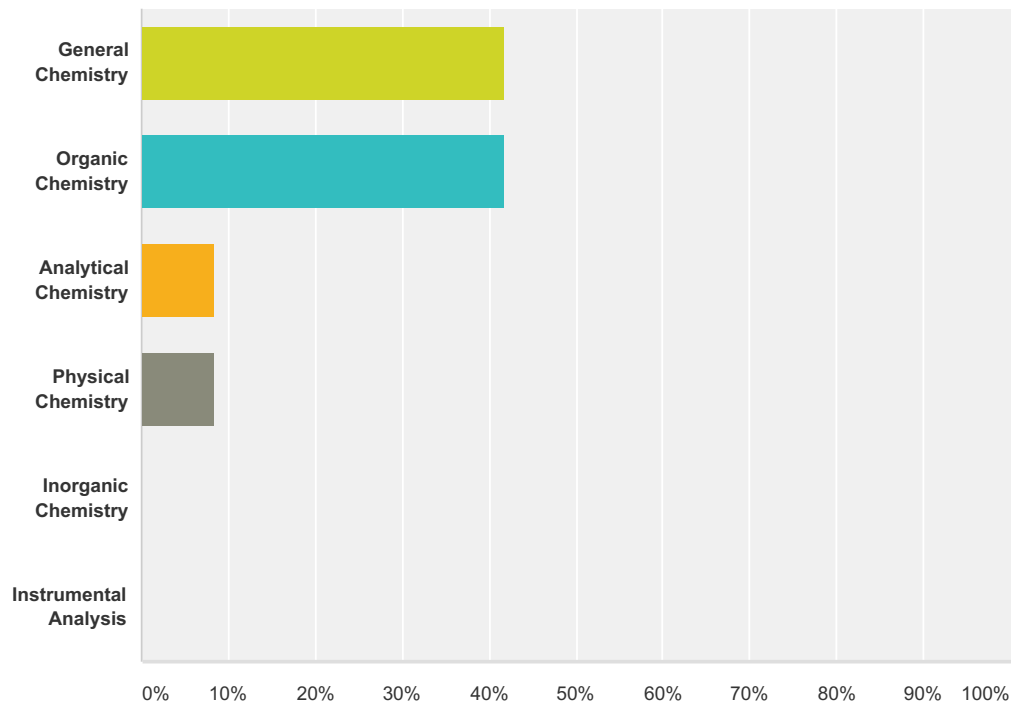


Answer Choices		Responses	
TA		37.04%	10
RA		48.15%	13
Neither		14.81%	4
Total			27

#	comments	Date
	There are no responses.	

Q15 If TA, in what course?

Answered: 12 Skipped: 24

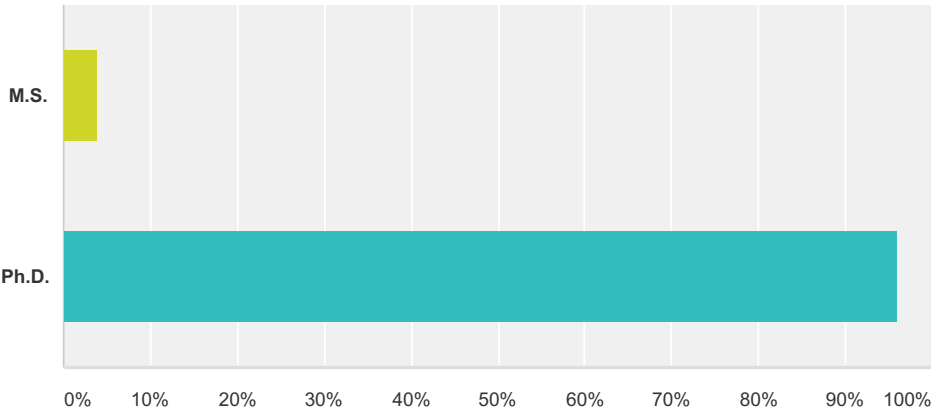


Answer Choices	Responses
General Chemistry	41.67%5
Organic Chemistry	41.67%5
Analytical Chemistry	8.33%1
Physical Chemistry	8.33%1
Inorganic Chemistry	0.00%0
Instrumental Analysis	0.00%0
Total	12

#	comments	Date
	There are no responses.	

Q16 Degree pursued

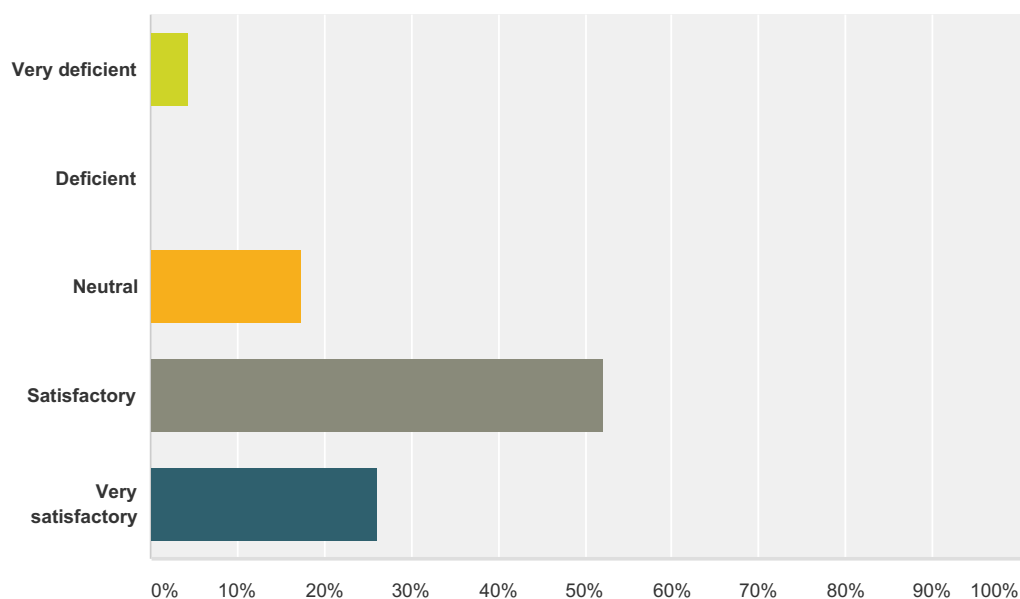
Answered: 25 Skipped: 11



Answer Choices	Responses	
M.S.	4.00%	1
Ph.D.	96.00%	24
Total		25

Q17 How would you rate your TA experience?

Answered: 23 Skipped: 13

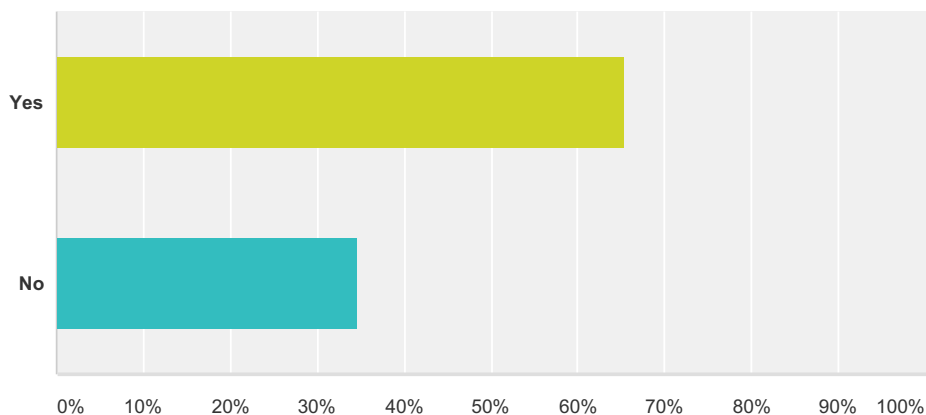


Answer Choices	Responses
Very deficient	4.35% 1
Deficient	0.00% 0
Neutral	17.39% 4
Satisfactory	52.17% 12
Very satisfactory	26.09% 6
Total	23

#	comments	Date
1	Coordinator manipulates evaluations	1/19/2016 11:55 PM
2	Excellent coordinator and experience.	12/18/2015 12:42 PM
3	El pago es mínimo para todo el trabajo que hay que realizar.	12/15/2015 1:55 PM
4	Satisfactory if compared to previous year. Still need to improve but at least is improving.	12/14/2015 10:05 AM
5	Every year they increase the amount of responsibility and chores in your TA experience, and the compensation (salary) is very low.	12/14/2015 9:49 AM
6	The experience what good, it gives you the opportunity to explore if you want to pursue and academic career as a professor, however it limit the time that you can spend in your research.	12/14/2015 8:50 AM

Q18 Would you recommend to a friend to pursue studies in our Chemistry Graduate Program?

Answered: 26 Skipped: 10

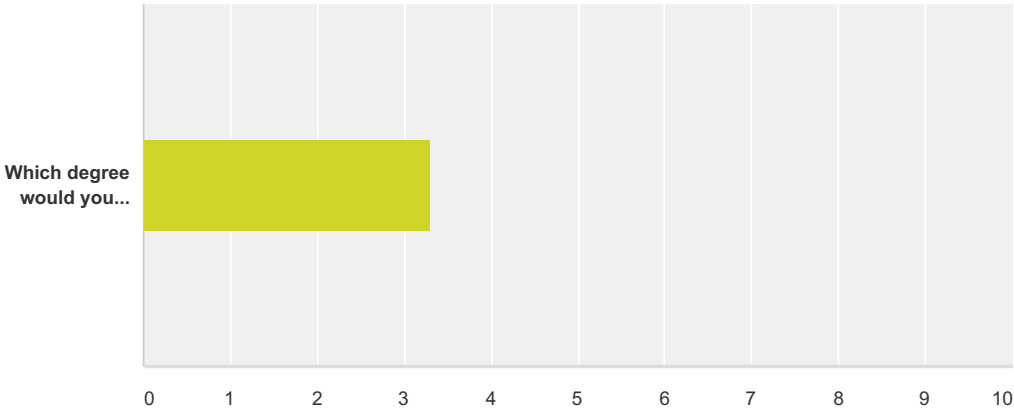


Answer Choices	Responses
Yes	65.38% 17
No	34.62% 9
Total	26

#	comments	Date
1	With some modifications to the program.	12/18/2015 12:42 PM
2	A lot of improvements have to be made.	12/15/2015 2:00 PM
3	NOT!	12/15/2015 1:55 PM
4	Absolutely No.	12/14/2015 9:49 AM
5	This an ambiguous answer. I will recommend UPR program because here in Puerto Rico is one of the alternatives to complete a PhD. The program need to improve in some aspects but overall is a complete program for chemist. However if students have the opportunity to pursue graduate studies in EU Im definitely recommend universities outside from Puerto Rico. For some many reasons; firstable there more funding opportunities you don't have to teach because most universities paid you a stipend. The facilities and the instrumentation available are better. Also the process to order and received material to do research is more accessible here in Puerto Rico due to the bureaucracy of our administration you have to wait sometimes three to six month to receive a particular reagent. This process in my opinion is one of the most biggest problem that UPR have.	12/14/2015 8:50 AM

Q19 Do you plan to continue studies after graduating from the program?

Answered: 26 Skipped: 10

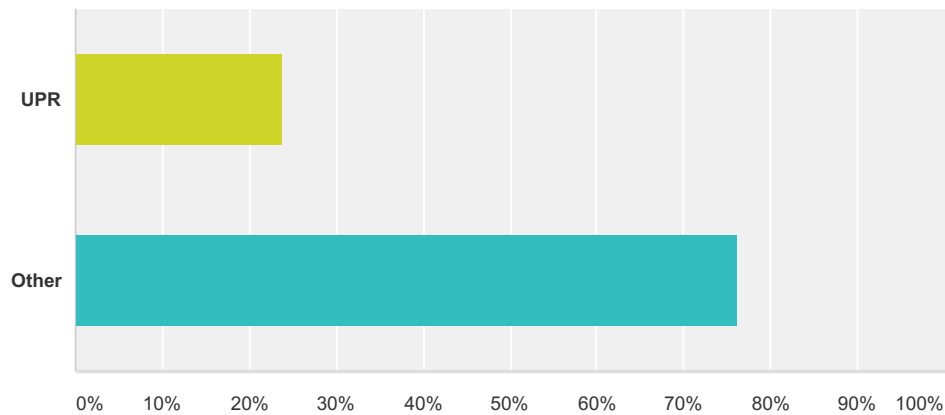


	Ph.D./Ed.D	Juris Doctor	Master	Postdoc.	Other	N/A	Total	Weighted Average
Which degree would you pursued?	15.38%	3.85%	0.00%	57.69%	0.00%	23.08%	26	3.30
	4	1	0	15	0	6		

#	comments	Date
1	Ya luego de terminar los estudios voy a proseguir con la busqueda de empleo preferiblemente en la industria.	12/15/2015 1:58 PM
2	I have been offered an opportunity for post-doctoral research at Colorado State University. I start on August 2016.	12/14/2015 5:32 PM

Q20 In which university?

Answered: 21 Skipped: 15

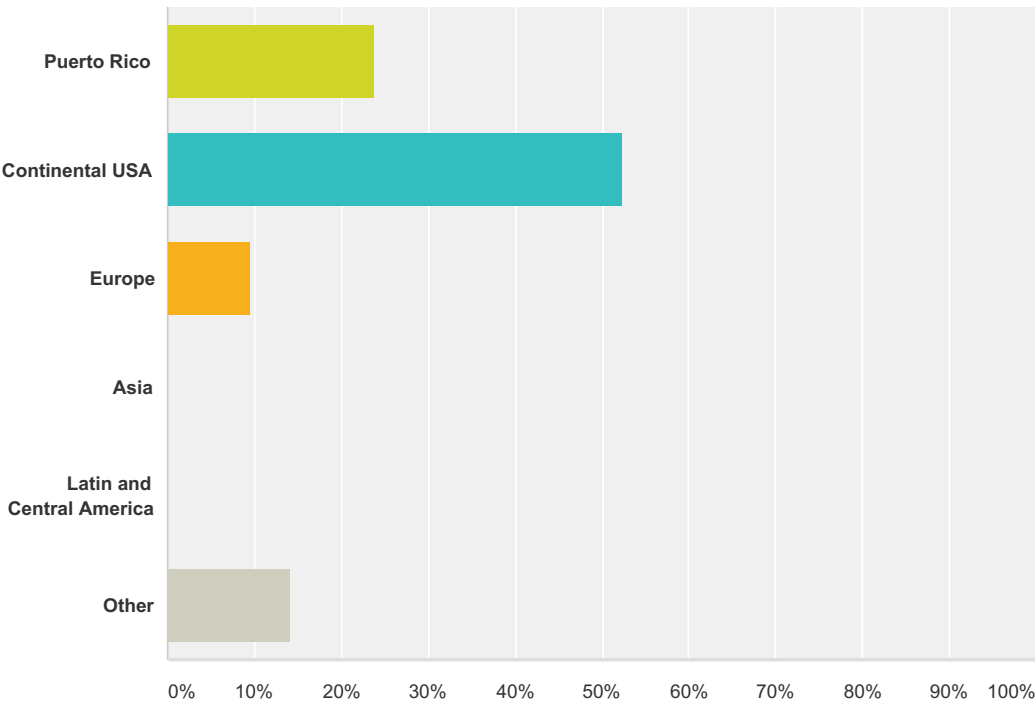


Answer Choices	Responses
UPR	23.81%5
Other	76.19%16
Total	21

#	comments	Date
1	N/A	12/20/2015 11:58 AM
2	N/A	12/15/2015 1:58 PM

Q21 Where?

Answered: 21 Skipped: 15

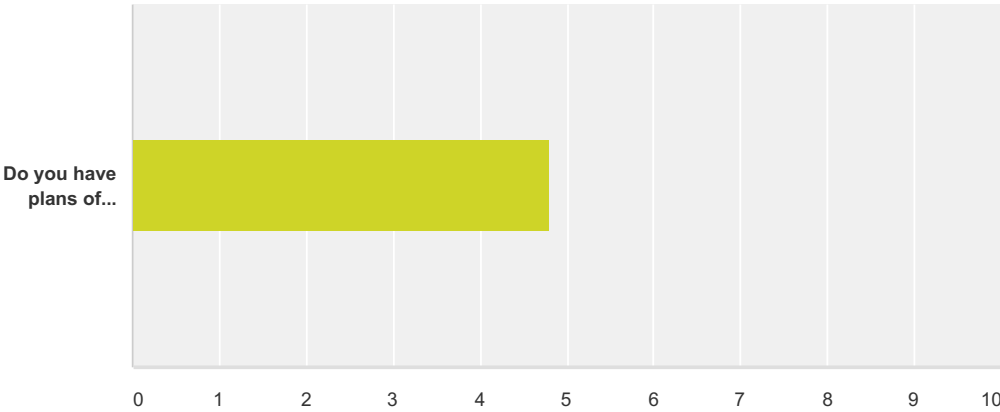


Answer Choices	Responses
Puerto Rico	23.81%5
Continental USA	52.38%11
Europe	9.52%2
Asia	0.00%0
Latin and Central America	0.00%0
Other	14.29%3
Total	21

#	comments	Date
1	N/A	12/20/2015 11:58 AM
2	N/A	12/15/2015 1:58 PM
3	También en Europa.	12/14/2015 8:23 AM

Q22 If you do not plan pursue further studies after graduating from our graduate program, please answer:

Answered: 20 Skipped: 16

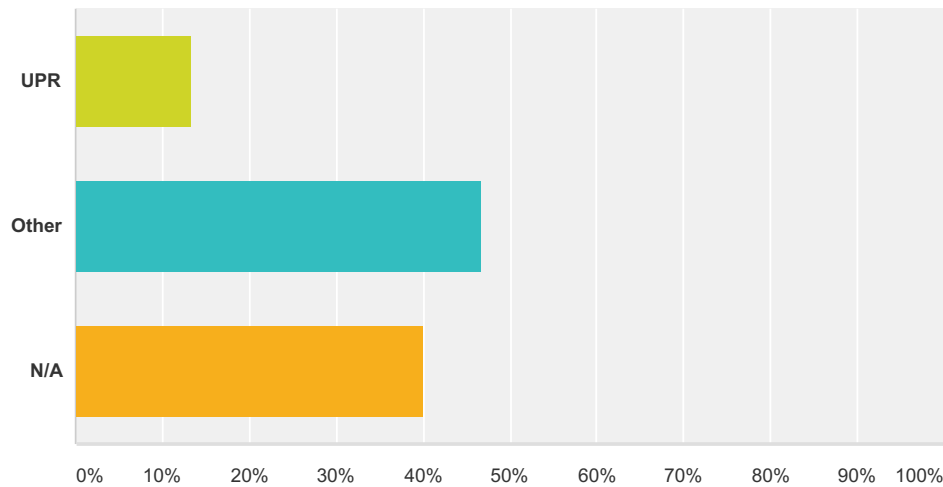


	Ph.D./Ed.D.	Juris Doctor	Masters	Postdoc.	Other	I have no plans of initiating further studies within the next five years	Total	Weighted Average
Do you have plans of initiating further studies for one of the following degrees within the next five years?	10.00% 2	0.00% 0	0.00% 0	30.00% 6	10.00% 2	50.00% 10	20	4.80

#	comments	Date
1	Work in the industry.	12/14/2015 9:50 AM

Q23 In which university?

Answered: 15 Skipped: 21

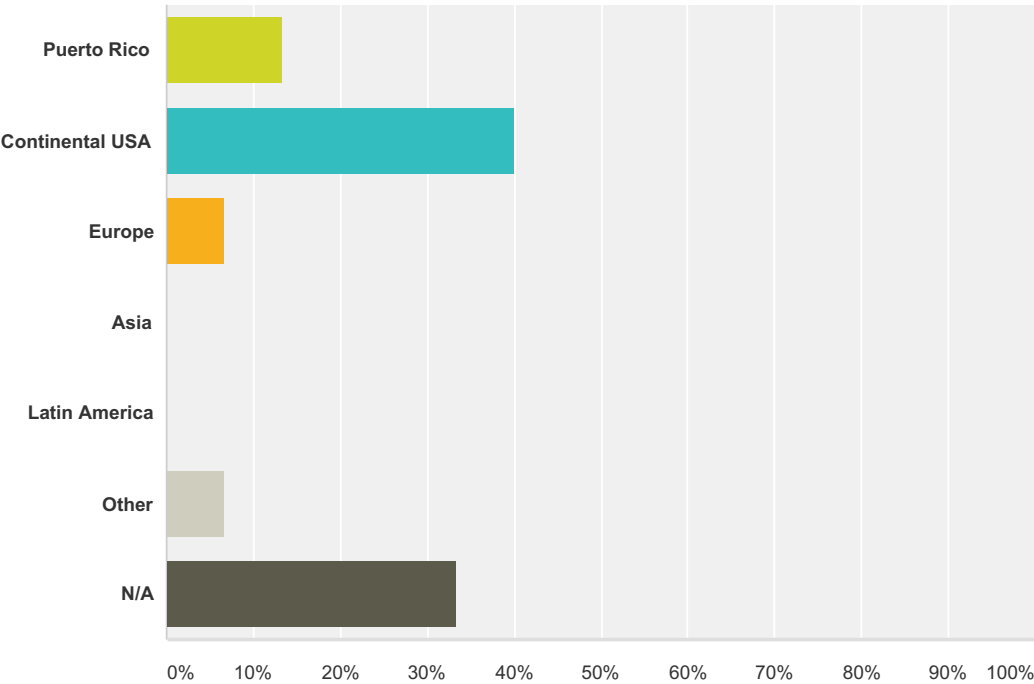


Answer Choices	Responses
UPR	13.33%2
Other	46.67%7
N/A	40.00%6
Total	15

#	comments	Date
	There are no responses.	

Q24 Where?

Answered: 15 Skipped: 21



Answer Choices	Responses
Puerto Rico	13.33%2
Continental USA	40.00%6
Europe	6.67%1
Asia	0.00%0
Latin America	0.00%0
Other	6.67%1
N/A	33.33%5
Total	15

#	comments	Date
	There are no responses.	

Q25 Additional final comments

Answered: 4 Skipped: 32

#	Responses	Date
1	Enfoquen el programa tambien en estudiantes que les interesa seguir en la industria. No todos estan interesados en la academia	1/19/2016 11:30 AM
2	I am very hopeful in the new program coordinator, he seems to be pro-student and easy to talk to, but also strict enough to implement much needed changes in our program. Hopefully the rest of the faculty will get on board with the new proposed changes. We are in 2015 and competing with top universities, we want to be competitive and not let former methods which are inefficient nowadays get in the way of our professional career development.	12/18/2015 12:47 PM
3	Hay que re-estructurar todo el programa para así mejorarlo y poder reclutar más estudiantes y lograr que nuestra escuela graduada vuelva a ser la q era hace muchos años atras.	12/15/2015 1:58 PM
4	Survey is too long and some questions are repetitive	12/14/2015 10:07 AM

Q26 If you wish to be considered to participate in a focus group on these subjects, please complete the following:

Answered: 3 Skipped: 33

Answer Choices	Responses
Name	100.00% 3
Company	33.33% 1
Address	66.67% 2
Address 2	66.67% 2
City/Town	100.00% 3
State/Province	66.67% 2
ZIP/Postal Code	66.67% 2
Country	66.67% 2
Email Address	100.00% 3
Phone Number	100.00% 3

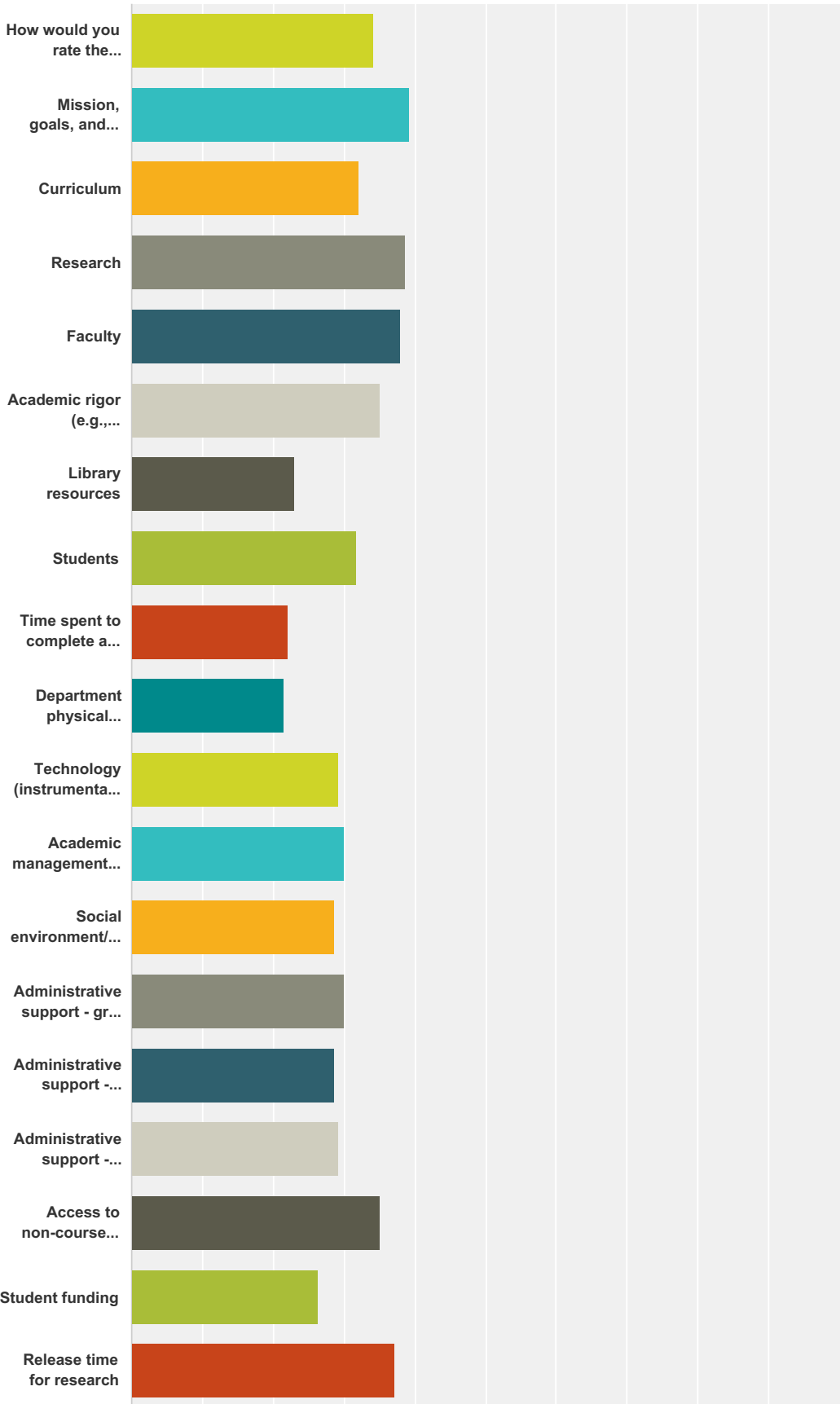
#	Name	Date
1	Fuzhao Yi	1/19/2016 4:03 PM
2	Lesly Carmona Sarabia	1/19/2016 2:06 PM
3	Cindy Figueroa	1/19/2016 11:30 AM
#	Company	Date
1	UPR	1/19/2016 2:06 PM
#	Address	Date
1	Avenida Juan Ponce De León	1/19/2016 4:03 PM
2	Avenida 4 universidad	1/19/2016 2:06 PM
#	Address 2	Date
1	Department of Chemistry, Facundo Bueso FB 265	1/19/2016 4:03 PM
2	Torre del norte	1/19/2016 2:06 PM
#	City/Town	Date
1	San Juan	1/19/2016 4:03 PM
2	Estados unidos	1/19/2016 2:06 PM
3	San Juan	1/19/2016 11:30 AM
#	State/Province	Date
1	PR	1/19/2016 4:03 PM
2	Puerto rico	1/19/2016 2:06 PM
#	ZIP/Postal Code	Date
1	00925	1/19/2016 4:03 PM
2	00925	1/19/2016 2:06 PM

#	Country	Date
1	Puerto Rico	1/19/2016 4:03 PM
2	San Juan	1/19/2016 2:06 PM
#	Email Address	Date
1	yifuzhaonk@gmail.com	1/19/2016 4:03 PM
2	lesly.carmona@upr.edu	1/19/2016 2:06 PM
3	cindyfm@gmail.com	1/19/2016 11:30 AM
#	Phone Number	Date
1	7872096790	1/19/2016 4:03 PM
2	7872439978	1/19/2016 2:06 PM
3	787-368-8476	1/19/2016 11:30 AM

Appendix 4

Q1 General impression of the program

Answered: 14 Skipped: 0





	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	Total	Weighted Average
How would you rate the overall graduate experience?	0.00% 0	7.14% 1	42.86% 6	50.00% 7	0.00% 0	14	3.43
Mission, goals, and objectives	0.00% 0	7.14% 1	14.29% 2	57.14% 8	21.43% 3	14	3.93
Curriculum	0.00% 0	21.43% 3	35.71% 5	42.86% 6	0.00% 0	14	3.21
Research	0.00% 0	0.00% 0	28.57% 4	57.14% 8	14.29% 2	14	3.86
Faculty	0.00% 0	7.14% 1	14.29% 2	71.43% 10	7.14% 1	14	3.79
Academic rigor (e.g., intellectually challenging)	0.00% 0	14.29% 2	28.57% 4	50.00% 7	7.14% 1	14	3.50
Library resources	14.29% 2	57.14% 8	14.29% 2	14.29% 2	0.00% 0	14	2.29
Students	0.00% 0	33.33% 4	25.00% 3	33.33% 4	8.33% 1	12	3.17
Time spent to complete a degree	28.57% 4	35.71% 5	21.43% 3	14.29% 2	0.00% 0	14	2.21
Department physical installations/Research facilities	28.57% 4	35.71% 5	28.57% 4	7.14% 1	0.00% 0	14	2.14
Technology (instrumentation, IT, network)	7.69% 1	30.77% 4	30.77% 4	23.08% 3	7.69% 1	13	2.92
Academic management (coordination, recruitment, student orientation, web site, program assessment, clarity of regulations, etc.)	0.00% 0	28.57% 4	42.86% 6	28.57% 4	0.00% 0	14	3.00
Social environment/Peer group support	0.00% 0	28.57% 4	57.14% 8	14.29% 2	0.00% 0	14	2.86
Administrative support - grant management	0.00% 0	23.08% 3	61.54% 8	7.69% 1	7.69% 1	13	3.00
Administrative support - facilities management	7.14% 1	21.43% 3	50.00% 7	21.43% 3	0.00% 0	14	2.86
Administrative support - course support	0.00% 0	38.46% 5	30.77% 4	30.77% 4	0.00% 0	13	2.92
Access to non-course activities - seminars, symposia	0.00% 0	7.14% 1	35.71% 5	57.14% 8	0.00% 0	14	3.50
Student funding	7.14% 1	42.86% 6	28.57% 4	21.43% 3	0.00% 0	14	2.64
Release time for research	0.00% 0	21.43% 3	14.29% 2	35.71% 5	28.57% 4	14	3.71
Funding opportunities	0.00% 0	14.29% 2	50.00% 7	28.57% 4	7.14% 1	14	3.29

#	Comments for "How would you rate the overall graduate experience?"	Date
1	The mentoring and variety of elective course offered to the students	2/8/2016 9:07 AM
2	Getting students working in the labs sooner would be very helpful. Developing multi-tasking skills and a better work ethic in students would also strengthen our program. There is too much diversity in the standards required for graduate degrees. Much of this can be attributed to differences in research direction and mentoring skills of the faculty.	1/19/2016 11:19 AM
3	La moral esta bien baja. La infraestructura (laboratorios, servicio de agua y electricidad, tuberías rotas, hongo en las paredes, ratones, mosquitos, etc) y la calidad de vida es pésima. Necesitamos un edificio nuevo moderno con instrumentación científica de primera. Los salarios de la facultad y de los estudiantes graduados son bochornosos.	1/19/2016 9:48 AM
4	I believe our Program will improve if we work more together, cooperate more and if we exchange ideas. Unfortunately, the administrative aspects continue to be inefficient. The maintenance of buildings is not good. For example, we have problems with the hoods and elevators.	1/19/2016 8:54 AM
5	There are positives and negatives. If students land in a productive and funded research group, their overall experience is comparable to other quality graduate programs in Chemistry. If they do not land in a productive and funded research group, their experience will in general be weaker.	1/13/2016 3:02 PM
6	I think the faculty needs to be more cohesive and form 'groups' to submit more competitive proposals. I think the graduate program needs to be revised and more attention should be given to the academic development of the students.	1/12/2016 9:44 AM
#	Comments for "Mission, goals, and objectives"	Date
1	Should be aligned with the needs and jobs offers that our students will find after completing the requirements for the degree.	2/8/2016 9:07 AM
2	I think that there needs to be better orientation for graduate students. I think that rigor is missing in places where students need help to develop as scientists. This has improved some over the years, but the quality of the program needs constant attention and higher standards.	1/19/2016 11:19 AM
3	A la luz de la situación económica del Pais que nos embarga tal vez es hora de repensar y re-evaluar los objetivos y las metas del Programa.	1/19/2016 9:48 AM
4	I am satisfied with our CGP because our students are well trained and we publish papers in high quality journals.	1/19/2016 8:54 AM
5	I am ok with the mission, goals and objectives. The issue is compliance	1/13/2016 3:02 PM
6	The goals are clear, now I am not sure they are being met.	1/12/2016 9:44 AM
#	Comments for "Curriculum"	Date
1	Should be revised to include more novel courses and more internship experiences for the students to promote that the established effective connections to pursue post doctoral experiences	2/8/2016 9:07 AM
2	I think that this is fine, but again, faculty must encourage their students to learn outside their immediate research areas to increase their overall knowledge of chemistry.	1/19/2016 11:19 AM
3	El currículo esta obsoleto. Hacen falta nuevos cursos y nuevos profesores.	1/19/2016 9:48 AM
4	The problem with our curriculum is that a few courses in moderns subjects have been inscribed. However, we know that such = courses are taught as special topics. The problem is that prospective students get the wrong impression when they look at our course list because it corresponds to the course taught more than 20 years ago. We should encourage the Faculty to create new courses.	1/19/2016 8:54 AM
5	the core graduate curriculum is out of date, and the electives are offered on a seldom basis or not at all. Very limited offer. The traditional subareas of Chemistry are very limiting, and need to be revised	1/13/2016 3:02 PM
6	I think we need a curriculum that makes sense in terms of the number of faculty and students. The courses should all be in english.	1/12/2016 9:44 AM
7	We need to revise the curriculum and based on this we should work on our graduate courses.	12/14/2015 9:19 AM
#	Comments for "Research"	Date
1	It has improved, but historically, some faculty have been very weak in the student development and publishing part of their research.	1/19/2016 11:19 AM
2	Hay que contratar más profesores jóvenes pero primero tenemos que mejorar los salarios y la oferta de trabajo para los mismos.	1/19/2016 9:48 AM

3	I respect the talent and work ethics of my colleagues. We have been able to attract excellent students. Our instrumentation is excellent. The Natural Sciences Library receives most of the collection we need. We need to establish a mentorship program for the new faculty members. I believe this is done through the Personal Committee, but is not the right way to orient our Faculty.	1/19/2016 8:54 AM
4	Research needs to be more consistent. There are some definite strengths, but also some definite weaknesses.	1/13/2016 3:02 PM
5	Some faculty are more research active than others, we need to propel the research efforts of all the faculty.	1/12/2016 9:44 AM
#	Comments for "Faculty"	Date
1	A number of senior faculty member have slowly disconnected from being good departamental citizens and have demonstrated apathy towards the GP routine affairs.	1/25/2016 7:12 PM
2	This could be improved. Historically, we have had a large presence of faculty who have had little or no real experience at developing students at the graduate level. Yet due to popularity and a lower level of research standards, they were attracted to these research directors. This has made it harder for others, including myself, to set high quality standards for my students to make them very competitive in today's market. I am fortunate that my students have been leaders rather than followers.	1/19/2016 11:19 AM
3	Se necesita atraer más estudiantes graduados que quieran estudiar Química. Un Departamento de Química sin suficientes estudiantes de calidad tiene sus días de existencia contados.	1/19/2016 9:48 AM
4	Our Faculty is excellent. We have to find ways to retain our new faculty members. For example, provide them with renovated laboratory space and improving our graduate recruitment program.	1/19/2016 8:54 AM
5	There are some good people who are very engaged, but there are numerous good faculty who have been marginalized by a non-existent reward system. Support system for faculty is weak, forcing many professors to spend too much time in administrative trivia.	1/13/2016 3:02 PM
6	We have an excellent faculty, maybe we need to work on	1/12/2016 9:44 AM
#	Comments for "Academic rigor (e.g., intellectually challenging)"	Date
1	We are not Caltech, Berkeley, MIT or Harvard. Overall, I would have to say that we are doing pretty well, all things considered.	1/19/2016 11:19 AM
2	La mayoría de la Facultad que esta dedicada a la investigación científica tiene que ser capaz de asegurar fondos externos para subvencionar sus trabajos. Hay que someter (y ganar) más y más propuestas y así poder liberar al Departamento de la carga excesiva de tener que pagar por tantos gastos y/o materiales.	1/19/2016 9:48 AM
3	Again, very inconsistent. Some professors are way too hard, others way too easy.	1/13/2016 3:02 PM
4	I think students need to be more intellectually challenge. This might serve as a motivational tool and foment an environment of intellectual discovery and innovation.	1/12/2016 9:44 AM
#	Comments for "Library resources"	Date
1	Access to electronic scientific journals is very limited and in the few cases that we have access it is unreliable (service suspensión, etc.)	1/25/2016 7:12 PM
2	Our access to journals and on-line searching are very limited compared to other libraries with which I am familiar (Purdue, UCal, UTenn, others).	1/19/2016 11:19 AM
3	Cada día que pasa son menos las revistas científicas y los servicios disponibles para los investigadores. Tal vez es hora de que el Departamento de Química tenga su propia biblioteca.	1/19/2016 9:48 AM
4	I think we have an excellent collection of scientific journals. Presently, there is an explosion of information and we have to decide which journals are relevant to us and which ones are no longer relevant to us. This was the work that Dr. Néstor Rodríguez did for numerous years. Perhaps the situation now is more critical considering our limited resources. The problem is that our library consumes 25% of the resource of the University.	1/19/2016 8:54 AM
5	Modern graduate program cannot operate without full electronic access to journals. Everybody is forced into making "arrangements" to get access.	1/13/2016 3:02 PM
6	Bad. No access to major publishing sources	1/12/2016 3:11 PM
7	Many times an article is not available through the library resources.	1/12/2016 9:44 AM
8	More and easier access to online resources.	1/12/2016 5:28 AM
9	We need more journals on-line. Faculty and students are constantly asking friends for copies of research articles. Once I had to ask a colleague for an electronic version of one of my publications!	12/14/2015 9:19 AM
#	Comments for "Students"	Date

1	Although we still can get a few good students, overall our student pool is on the average academically weak.	1/25/2016 7:12 PM
2	I have been very fortunate to have directed the research of many students, most of whom came from Puerto Rico. All needed development, but they took advantage of their opportunities. I am pleased that all are continuing to grow their careers and are a big source of pride for me.	1/19/2016 11:19 AM
3	Los mejores estudiantes se van de la Isla a estudiar a los Estados Unidos. La opción de quedarse a estudiar en la UPR-RP parece ser cada vez menos atractiva para ellos. Hay que mejorar mucho la exposición y la imagen del Programa tanto localmente como internacionalmente.	1/19/2016 9:48 AM
4	We continue attracting good students. But the number of students that is entering in the past few years has decreased and this may have an adverse affect in the development of our junior faculty members.	1/19/2016 8:54 AM
5	This is very complicated. Good students only come to UPR for another reason, not because they are primarily attracted to the program. Many barriers for attracting good students: TA salaries, laboratory conditions, inadequate student services.	1/13/2016 3:02 PM
6	I think we need to make an effort to recruit more international students, students from the US and South America that are more intellectually apt for graduate school.	1/12/2016 9:44 AM
7	More selective recruiting process.	1/12/2016 5:28 AM
#	Comments for "Time spent to complete a degree"	Date
1	Our time-to-degree record is very bad. Problem is that many students are not putting full efforts and researchers are riding along with them.	1/25/2016 7:12 PM
2	My students have taken more time than many to graduate. I make no apology for this because they needed the time to complete their thesis work as it was mutually agreed to for publication. Other have sometimes graduated students before they were ready and had reached their goals. This has been a problem for the students and their career opportunities.	1/19/2016 11:19 AM
3	El tiempo para completar el grado de doctor en Química es ridículamente largo. Si existiera una atmósfera académica superior en nuestro Departamento, este problema de debería corregir automáticamente.	1/19/2016 9:48 AM
4	I believe this questionnaire is more related to the doctoral program. I think we should try to decrease the time to degree. So that our students complete their careers (including post-doctoral experience) with less than 30 years old. Part of our problem is that our students become productive after their third year and then struggle to minimize graduate their presence in the CGP. This may be improved reducing the course work and requirement at the risk of producing students with deficiencies in their training. On the other hand, fostering our intellectual atmosphere to simulate productivity is an alternative that deserves careful consideration.	1/19/2016 8:54 AM
5	Depends. Students need to understand that if they want to complete a degree in 4-5 years with a solid dissertation, then they need to work very hard. This includes nights and weekends, etc. - this is what happens at competing institutions. They cannot treat graduate school as 35 hour a week union job and expect to graduate in 4-5 years.	1/13/2016 3:02 PM
6	It depends a lot on the student. However, the school must come with a renovated program that leads more to research and much less on courses and requirements.	1/12/2016 3:11 PM
7	I think we should work better to make an environment where students have the necessary resources to complete their degree in a timely manner. (mentors, equipment, materials, literature resources, motivation)	1/12/2016 9:44 AM
8	Constant monitoring of progress and reduce requirements to the essential.	1/12/2016 5:28 AM
9	The time to degree is too high. There are groups where students have spent 8 years trying to finish a master degree. This is unacceptable.	12/14/2015 9:19 AM
#	Comments for "Department physical installations/Research facilities"	Date
1	Very poor physical plant in Facundo Bueso. New building is excellent.	1/25/2016 7:12 PM
2	No preventative maintenance. The physical work done by the University is very amateurish and low quality. The place (FB) looks like a dump with wires hanging out, rust and fungus all over and poor attention to detail.	1/19/2016 11:19 AM
3	La gran mayoría de los laboratorios de investigación son bombas de tiempo. Es un verdadero milagro que muchos de ellos todavía siguen funcionando a pesar de las múltiples violaciones a las regulaciones impuestas por el Departamento de Bomberos y la Policía de PR.	1/19/2016 9:48 AM
4	Perhaps this is our weakest point. The Facundo Bueso Building is not adequate for research; in particular, no elevators, no fume hoods, no stock room, and lack of maintenance.	1/19/2016 8:54 AM
5	Bad condition.	1/12/2016 3:11 PM

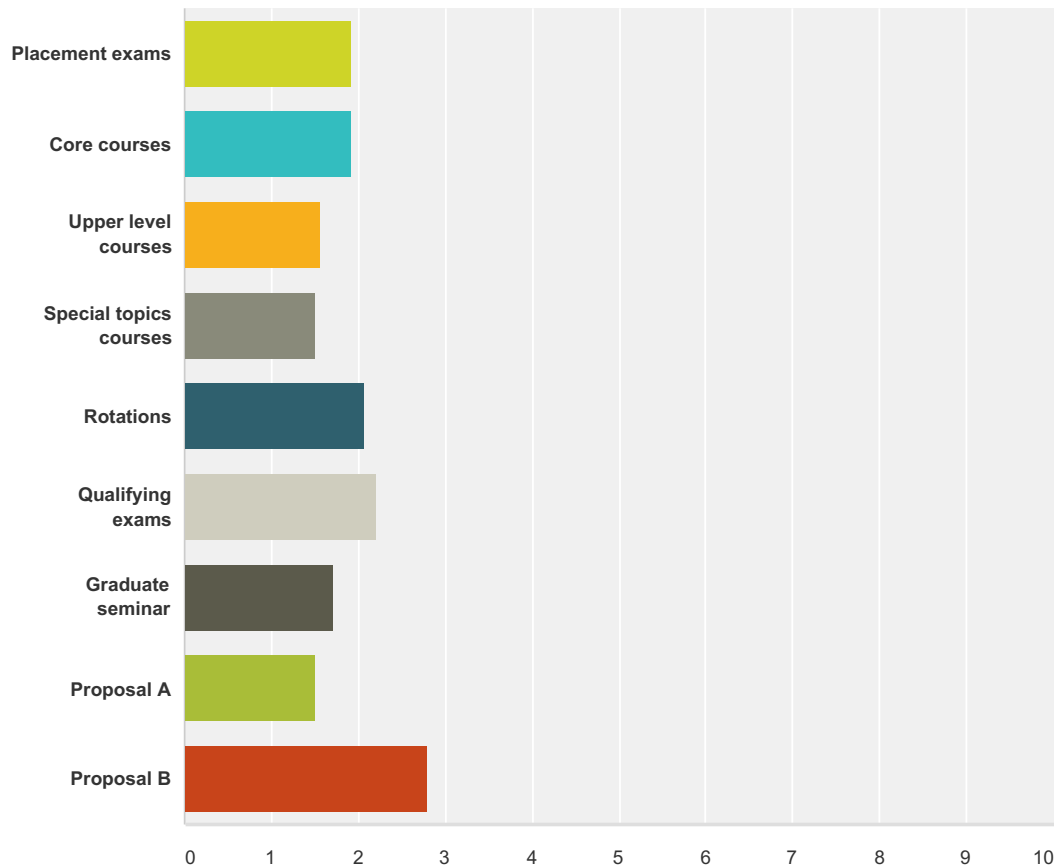
6	They need to be renovated. Bathrooms, Hoods, research bench, internet, AC's, student offices, professors offices, instruments need to be bought, etc)	1/12/2016 9:44 AM
7	Facundo Bueso building is not an appropriate research building. A new research building on campus is needed.	1/12/2016 5:28 AM
8	The facilities in Facundo Bueso are extremely deficient. Most fume hoods are not working and power outages constantly damage sensitive instrumentation.	12/14/2015 9:19 AM
#	Comments for "Technology (instrumentation, IT, network)"	Date
1	Research Instrumentation is fine, although aging. On the other hand, what IT and what network? in Facundo Bueso.	1/25/2016 7:12 PM
2	Many Departmental instruments are not kept in working order (the MS faculty is one example). We have had problems with NMR because of not paying the service contract. I could go on. Big problem.	1/19/2016 11:19 AM
3	La mayoría de los instrumentos están obsoletos. Hay que seguir escribiendo propuestas y/o solicitar donativos de la Industria para resolver este serio problema.	1/19/2016 9:48 AM
4	Slow internet and intermittent.	1/12/2016 3:11 PM
5	New instruments need to be available and functional. Internet is a must.	1/12/2016 9:44 AM
6	Ethernet access is not available on the Facundo Bueso building. Wifi access is inconsistent.	1/12/2016 5:28 AM
#	Comments for "Academic management (coordination, recruitment, student orientation, web site, program assessment, clarity of regulations, etc.)"	Date
1	A great effort is currently being performed. The academic management area has recently improved. Please keep it up.	1/25/2016 7:12 PM
2	I don't see great vision here. With Cuba opening up, maybe we could attract students from outside PR . Faculty have used connections to bring students from China, India and Europe. This helps to make a better Program by increasing diversity. Strict adherence to the existing rules and regulations would also help. We have seen improvements here.	1/19/2016 11:19 AM
3	Don't get me started please!	1/19/2016 9:48 AM
4	I believe we are fine. The Chairperson and the Coordinator should stimulate committee work in order to improve our image and our student recruitment strategies. The Coordinator alone cannot deal with all this in the middle of this economic crisis. We have to remind our Faculty that is nice that they are doing what they like to do in their corresponding laboratories, but it corresponds to us to run our Program.	1/19/2016 8:54 AM
5	There must be a coordinated effort to fix this.	1/12/2016 3:11 PM
6	The website needs to be renovated. Things needs to be more organized (mostly planned in the long term, weeks in advance). Students needs to have accessible information in the website. Everything sees to be word of mouth.	1/12/2016 9:44 AM
7	Web site needs to be improved ASAP.	1/12/2016 5:28 AM
8	The website needs to be improved.	12/14/2015 9:19 AM
#	Comments for "Social environment/Peer group support"	Date
1	Social interactions are very limited for students and worst for faculty. The new chemistry student organization is helping and have organized several nice activities.	1/25/2016 7:12 PM
2	Too much homogeneity in both the faculty and the student body to have a culturally inclusive social environment.	1/19/2016 11:19 AM
3	Non existant! Not sure how to improve this.	1/19/2016 9:48 AM
4	Our CGP needs to improve the intellectual atmosphere. There should be opportunity for our students to talk about their projects and the ideas they plan to implement. Students should constantly be exposed to new concepts and to the last discoveries.	1/19/2016 8:54 AM
5	Not enough opportunities provided.	1/12/2016 5:28 AM
#	Comments for "Administrative support - grant management"	Date
1	DEGI's pre-award works fine, but they have slowly developed (as the rest of the University administration) an adversarial style. We sholud all have the same goals, that is, to be successful in all graduate endeavors, specially seeking external funds.	1/25/2016 7:12 PM
2	I had to switch my NSF grant to university rather than Resource Center management because of arbitrary bureaucratic mismanagement. The university is also not without issues.	1/19/2016 11:19 AM
3	Aqui no tengo quejas. En general mi experiencia con este renglón ha sido muy buena.	1/19/2016 9:48 AM
4	It is taking too long to get fixed the light of an office or laboratory, to make new keys, to prepare contracts, to make photocopies.	1/19/2016 8:54 AM

5	I think the deadlines for proposal submission are ridiculous.	1/12/2016 9:44 AM
6	Grant management people are too overwhelmed with work (do to limited number of personnel). It is hard to get them to focus on getting your orders on time and getting invoices sent on schedule.	1/12/2016 5:28 AM
7	Post grant management continues to be an issue.	12/14/2015 9:19 AM
#	Comments for "Administrative support - facilities management"	Date
1	Core facilities could be better managed. More training, paying service contract on time, having needed supplies, etc.	1/25/2016 7:12 PM
2	I believe that the politics of university management has hurt the system greatly. The connection of politics and management led to strikes which shut down UPR and ultimately resulted in many students going elsewhere to school. They let thugs run wild on campus for months. Research and education went to ZERO.	1/19/2016 11:19 AM
3	Lo mucho que se tardan las ordenes de compra siempre ha sido un dolor de cabeza en nuestro Departamento. Lamentablemente, este problema no tiene solución. Hemos tratado todo lo que aparece en el libro y siempre volvemos a lo mismo.	1/19/2016 9:48 AM
4	I guess this question refers to facilities such as the NMR facilities, surface analysis, etc. Our research group seldom use those facilities, but when we needed to run an experiment we received support.	1/19/2016 8:54 AM
5	Waiting for fixing little things is outrageous.	1/12/2016 3:11 PM
6	they do more work than asked or payed for (not Aida, but Carlos, Wilma, Christopher and Gisela).	1/12/2016 9:44 AM
7	It is so dependent on what can be obtained from the campus facilities people, that it is hard to get timely support with respect to facilities.	1/12/2016 5:28 AM
8	There is no stockroom in Facundo Bueso nor receiving facilities.	12/14/2015 9:19 AM
#	Comments for "Administrative support - course support"	Date
1	Improve the library (on-line access). Take better care of the classrooms.	1/19/2016 11:19 AM
2	Siempre he estado bastante satisfecho con este renglón. Sin embargo, necesitamos una secretaria en el Programa Graduado de Química que sea mas responsable y que esté más comprometida con el mejoramiento del Programa.	1/19/2016 9:48 AM
3	I believe this question is concerned with audiovisual equipment and quality of the class room. We have only one lecture room in FB Building equipped with a projector and new boards. Because varios research groups moved to the Molecular Science Building the demand for this room has decreased.	1/19/2016 8:54 AM
4	what is that?	1/12/2016 9:44 AM
5	Less than that at the undergraduate level.	1/12/2016 5:28 AM
#	Comments for "Access to non-course activities - seminars, symposia"	Date
1	Historically, this has been ok (travel money for students to attend meetings, money for external speakers from several sources).	1/19/2016 11:19 AM
2	Sería bueno explorar horas y días alternos para llevar a cabo el Seminario Graduado de Química. También, debería ser compulsorio que todo el mundo asista a los seminarios de defensa de tesis.	1/19/2016 9:48 AM
3	If consider that we are running a seminar program with a small budged, then we should consider that our seminar program is good. However, some years the program is not balanced.	1/19/2016 8:54 AM
4	Need more variety suited to students needs.	1/12/2016 5:28 AM
#	Comments for "Student funding"	Date
1	We need more funding opportunities for students, but this should also be the responsibility of the mentors.	1/25/2016 7:12 PM
2	Low salaries for TA's and RA's. Has improved.	1/19/2016 11:19 AM
3	Hay que subirle el estipendio académico a los estudiantes graduados.	1/19/2016 9:48 AM
4	I believe all our students are supported either by external funds or by PEAf's. The amount of money provided by the PEAf is too low for foreign students to survive here. PEAf's do not cover the summer period. In addition, students that receive PEAf's have to pay for their medical plan.	1/19/2016 8:54 AM
5	Teaching assistants should be funded for a period of 12 months, not for 9 months only.	1/12/2016 7:16 AM
6	Training grants needed urgently to facilitate students completion of the program in 5 years.	1/12/2016 5:28 AM
7	Funding for international students continues to be an issue.	12/14/2015 9:19 AM
#	Comments for "Release time for research"	Date

1	Overall in our College, research time is adequate, although some people are getting more than what they can justify with their productivity and external funding. Hard working and productive researcher are OK.	1/25/2016 7:12 PM
2	I always thought that this was fine in recent years. So long as something good (PhD grads, pubs, competitive grants) comes of this, faculty should receive release time. If not, their teaching load should be increased. It should be earned.	1/19/2016 11:19 AM
3	Estoy muy satisfecho con este renglón.	1/19/2016 9:48 AM
4	This has been excellent.	1/19/2016 8:54 AM
#	Comments for "Funding opportunities"	Date
1	The level of independent funding continues to shrink in chemistry. Something needs to be done.	1/25/2016 7:12 PM
2	This has been fine, but minority money has hurt competitive grants at UPR.	1/19/2016 11:19 AM
3	Las oportunidades existen y están accesibles. Los investigadores solamente tienen que poner más de su parte y someter (y ganar) más y más propuestas.	1/19/2016 9:48 AM
4	The funding opportunities do not depend on us. I do not understand this question. If the question refers to the efforts that the University makes to bring to our attention funding opportunities, then my answer is not very favorable.	1/19/2016 8:54 AM
5	More local (government, science trust, university) research funding opportunities needed.	1/12/2016 5:28 AM

Q2 Which of the following program requirements do you consider are necessary to be kept in the program for students to develop critical thinking and ability for independent studies and research?

Answered: 14 Skipped: 0



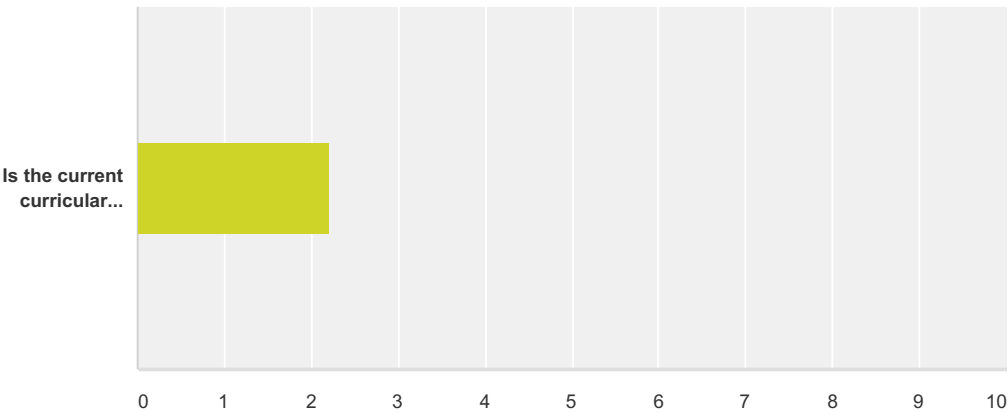
	Definitely necessary	Probably necessary	Neutral	Probably not necessary	Definitely not necessary	N/A	Total	Weighted Average
Placement exams	50.00% 7	35.71% 5	0.00% 0	0.00% 0	14.29% 2	0.00% 0	14	1.93
Core courses	64.29% 9	7.14% 1	7.14% 1	14.29% 2	7.14% 1	0.00% 0	14	1.93
Upper level courses	71.43% 10	14.29% 2	7.14% 1	0.00% 0	7.14% 1	0.00% 0	14	1.57
Special topics courses	71.43% 10	21.43% 3	0.00% 0	0.00% 0	7.14% 1	0.00% 0	14	1.50
Rotations	35.71% 5	35.71% 5	14.29% 2	14.29% 2	0.00% 0	0.00% 0	14	2.07
Qualifying exams	35.71% 5	42.86% 6	0.00% 0	7.14% 1	14.29% 2	0.00% 0	14	2.21

Graduate seminar	57.14% 8	28.57% 4	7.14% 1	0.00% 0	7.14% 1	0.00% 0	14	1.71
Proposal A	71.43% 10	21.43% 3	0.00% 0	0.00% 0	7.14% 1	0.00% 0	14	1.50
Proposal B	28.57% 4	21.43% 3	7.14% 1	28.57% 4	14.29% 2	0.00% 0	14	2.79

#	Comments for "Placement exams"	Date
1	Tells us where the student is and what they need to work on.	1/19/2016 11:44 AM
#	Comments for "Core courses"	Date
1	In Puerto Rico there are not many ways that students are encouraged to be self-motivated. Developing a work ethic and learning-for-learning's sake are essential. We are not ready for self-development yet.	1/19/2016 11:44 AM
2	There must be courses in the area of specialty for the students. I would suggest two core courses and then after that only specialized courses.	1/12/2016 3:20 PM
#	Comments for "Upper level courses"	Date
1	These are essential to develop students to an operational level and transition them to a self-study educational development.	1/19/2016 11:44 AM
#	Comments for "Special topics courses"	Date
1	These are essential to develop students to an operational level and transition them to a self-study educational development.	1/19/2016 11:44 AM
2	This are the courses that I consider should spark student's interest.	1/12/2016 3:20 PM
#	Comments for "Rotations"	Date
1	If by this, you mean going around to various labs to decide on your research group. Yes, good idea (I did this myself).	1/19/2016 11:44 AM
2	It is a good opportunity for the student to get to know the different labs.	1/12/2016 3:20 PM
#	Comments for "Qualifying exams"	Date
1	Absolutely essential to assure the competence matches the program	1/19/2016 11:44 AM
#	Comments for "Graduate seminar"	Date
1	Great opportunity to select topics, gather and organize data and information, learn material in depth, develop AV skills, prepare slides, develop public speaking skills, handle questions in a public forum and grow as a scientist.	1/19/2016 11:44 AM
2	This is a good opportunity for the student to get prepared for talks to a scientific audience. I believe that with some changes it should be kept.	1/12/2016 3:20 PM
#	Comments for "Proposal A"	Date
1	I like this because the students learn the background behind their thesis studies and what contributions their group has published. They learn what and why they are doing their project.	1/19/2016 11:44 AM
2	This is in my opinion the real and the very one requisite that must be kept intact. Nevertheless I would suggest that the committee meet the student not only once. In this way the committee holds the student accountable for the progress.	1/12/2016 3:20 PM
3	Helps the student orient his research project.	12/14/2015 9:21 AM
#	Comments for "Proposal B"	Date
1	If this is well done, it is a big plus. Original ideas are hard for people who have learned through memorization. If the faculty does its homework, this can be a very revealing item for a person's knowledge and development. No research director should ever serve on his own student's committee because of the obvious conflict of interest. It used to be this way at UPR, and it was a disaster. I'm glad that we changed that.	1/19/2016 11:44 AM
2	The proposal B is just redundant and the objectives of this proposal should be covered with a seminar or course or any other similar. I believe that the objectives are important but it is just another example on how our school takes the student out of the bench. Indeed, some of the objectives of this requisite should be included in Proposal A, namely the proposal format and rigurosity and even the budget preparation...	1/12/2016 3:20 PM

Q3 Curricular sequence

Answered: 14 Skipped: 0

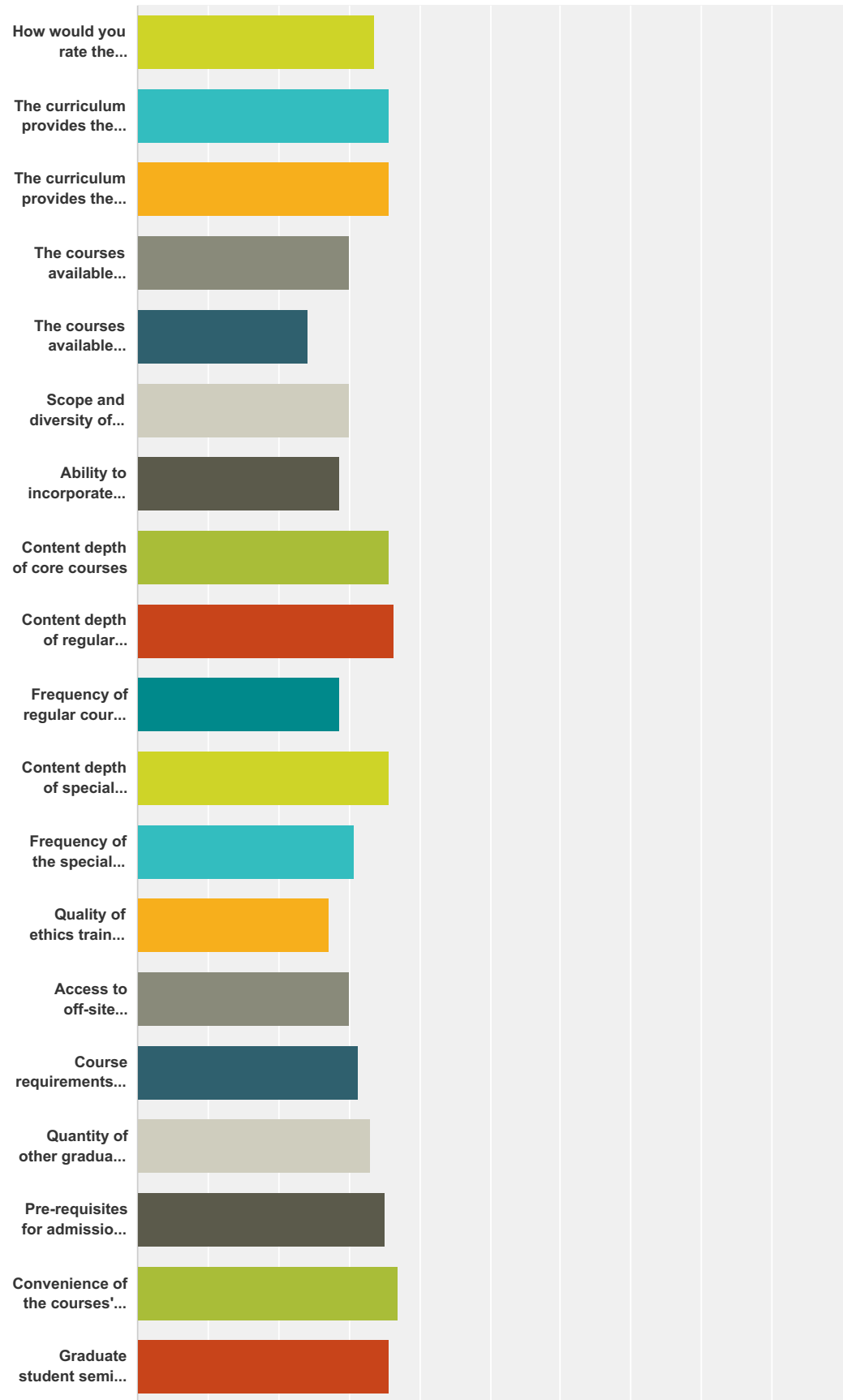


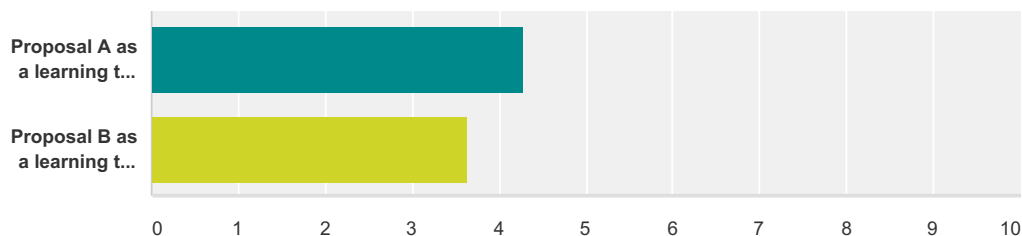
	Definitely affects	Probably affects	Neutral	Probably does not affect	Definitely does not affect	N/A	Total	Weighted Average
Is the current curricular sequence affecting the time to degree?	35.71% 5	35.71% 5	7.14% 1	14.29% 2	7.14% 1	0.00% 0	14	2.21

#	Comments for "Is the current curricular sequence affecting the time to degree?"	Date
1	Graduate seminar is to late. It should be delivered the third semester.	1/25/2016 7:15 PM
2	I'm not sure. We must teach multi-tasking to reduce the graduation times.	1/19/2016 11:44 AM

Q4 Courses, Overall Experience

Answered: 14 Skipped: 0





	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
How would you rate the graduate curriculum and curricular experience?	0.00% 0	28.57% 4	14.29% 2	50.00% 7	7.14% 1	0.00% 0	14	3.36
The curriculum provides the skills and knowledge required for a M.S. degree	0.00% 0	21.43% 3	14.29% 2	50.00% 7	14.29% 2	0.00% 0	14	3.57
The curriculum provides the skills and knowledge required for a Ph.D. degree in Science	0.00% 0	21.43% 3	14.29% 2	50.00% 7	14.29% 2	0.00% 0	14	3.57
The courses available provide students with the necessary skills and knowledge to successfully carry out graduate level research (i.e., there is nothing missing)	0.00% 0	42.86% 6	14.29% 2	42.86% 6	0.00% 0	0.00% 0	14	3.00
The courses available prepare students for writing the thesis	14.29% 2	42.86% 6	28.57% 4	14.29% 2	0.00% 0	0.00% 0	14	2.43
Scope and diversity of graduate courses in the program	0.00% 0	42.86% 6	21.43% 3	28.57% 4	7.14% 1	0.00% 0	14	3.00
Ability to incorporate ethics training in curriculum	7.14% 1	28.57% 4	35.71% 5	28.57% 4	0.00% 0	0.00% 0	14	2.86
Content depth of core courses	0.00% 0	7.14% 1	35.71% 5	50.00% 7	7.14% 1	0.00% 0	14	3.57
Content depth of regular graduate courses offered after the core courses	0.00% 0	0.00% 0	42.86% 6	50.00% 7	7.14% 1	0.00% 0	14	3.64
Frequency of regular courses offered after the core courses	7.14% 1	35.71% 5	28.57% 4	21.43% 3	7.14% 1	0.00% 0	14	2.86
Content depth of special topics' courses offered after the core courses	0.00% 0	7.14% 1	35.71% 5	50.00% 7	7.14% 1	0.00% 0	14	3.57
Frequency of the special topic's courses offered after the core courses	0.00% 0	35.71% 5	28.57% 4	28.57% 4	7.14% 1	0.00% 0	14	3.07
Quality of ethics training related to chemical research as incorporated in curriculum or in orientation	7.14% 1	28.57% 4	50.00% 7	14.29% 2	0.00% 0	0.00% 0	14	2.71
Access to off-site internships and locations for collaborative research opportunities	7.14% 1	21.43% 3	28.57% 4	35.71% 5	0.00% 0	7.14% 1	14	3.00
Course requirements to complete degree (number of credits required)	0.00% 0	28.57% 4	35.71% 5	28.57% 4	7.14% 1	0.00% 0	14	3.14
Quantity of other graduate program degree requirements	0.00% 0	14.29% 2	50.00% 7	28.57% 4	7.14% 1	0.00% 0	14	3.29
Pre-requisites for admission (are they enough?)	7.14% 1	7.14% 1	21.43% 3	57.14% 8	7.14% 1	0.00% 0	14	3.50
Convenience of the courses' time schedule	0.00% 0	15.38% 2	15.38% 2	53.85% 7	15.38% 2	0.00% 0	13	3.69
Graduate student seminar as a learning tool for problem solving and to conduct independent studies	0.00% 0	28.57% 4	7.14% 1	42.86% 6	21.43% 3	0.00% 0	14	3.57

Proposal A as a learning tool to facilitate the organization and planning of the thesis project	0.00% 0	0.00% 0	0.00% 0	71.43% 10	28.57% 4	0.00% 0	14	4.29
Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for a professional career	0.00% 0	21.43% 3	7.14% 1	57.14% 8	14.29% 2	0.00% 0	14	3.64

#	Comments for "How would you rate the graduate curriculum and curricular experience?"	Date
1	I'm ok with this.	1/19/2016 12:39 PM
2	We need to improve the way we plan the our course offering. Students should know what advanced courses are going to be taught in the next few semester.	1/19/2016 10:23 AM
3	Students need to have information ahead of time of the courses that will be offered in the next 2 years.	1/12/2016 6:17 AM
#	Comments for "The curriculum provides the skills and knowledge required for a M.S. degree"	Date
1	Need to implement/enforce publication requirement. To have MS degree, need skills (lab, writing, goal achievement) above BS to advance at that level in industry.	1/19/2016 12:39 PM
2	It does for a M.S. degree geared to a future Ph.D., but not as a terminal degree with the skills needed in the current employment environment.	1/12/2016 6:17 AM
#	Comments for "The curriculum provides the skills and knowledge required for a Ph.D. degree in Science"	Date
1	This varies with the research advisor and his assessment of the student's needs.	1/19/2016 12:39 PM
#	Comments for "The courses available provide students with the necessary skills and knowledge to successfully carry out graduate level research (i.e., there is nothing missing)"	Date
1	The student needs literature knowledge and laboratory skills not taught in the classroom.	1/19/2016 12:39 PM
2	We should stimulate our Faculty to create new courses in the frontier of science (nano chemistry, surface science, etc). This has been done through special topics.	1/19/2016 10:23 AM
3	There are courses that would be better served by a team teaching approach. In this way we enrich student experience.	1/12/2016 3:33 PM
#	Comments for "The courses available prepare students for writing the thesis"	Date
1	No courses are available to teach the student how to write a thesis.	1/19/2016 12:39 PM
2	I believe our students learn scientific writing with their mentors.	1/19/2016 10:23 AM
3	No. This should be included in that Proposal B seminar.	1/12/2016 3:33 PM
#	Comments for "Scope and diversity of graduate courses in the program"	Date
1	Generally, quite appropriate and available.	1/19/2016 12:39 PM
2	More special topics courses should be converted to regular courses so that they are available to students more frequently.	1/12/2016 6:17 AM
#	Comments for "Ability to incorporate ethics training in curriculum"	Date
1	Mentors can provide this, they just need to believe in it.	1/25/2016 7:26 PM
2	This comes out of the faculty advising, course presentations and other discussions.	1/19/2016 12:39 PM
3	There should be a certain number of ethics seminars as part of our seminar program. However, in the group meetings the mentors should orient students with respect to ethical issues. For example, emphasize that experiments must be reproducible. That strict procedure must be followed before some date is published.	1/19/2016 10:23 AM
4	Case studies.	1/12/2016 6:17 AM
#	Comments for "Content depth of core courses"	Date
1	Competitive with similar universities.	1/19/2016 12:39 PM
2	Some of the courses are just a repetition of the undergrad course (e.g. analytical)	1/12/2016 3:33 PM
#	Comments for "Content depth of regular graduate courses offered after the core courses"	Date
1	These usually represent areas of interest to faculty and are very current.	1/19/2016 12:39 PM
2	This is difficult to judge because we tend to follow what is done in our division.	1/19/2016 10:23 AM
#	Comments for "Frequency of regular courses offered after the core courses"	Date

1	Most are available once a year or once every two years which is fine.	1/19/2016 12:39 PM
#	Comments for "Content depth of special topics' courses offered after the core courses"	Date
1	These are generally pretty rigorous and current.	1/19/2016 12:39 PM
2	This item is difficult to judge. But I have a good impression of the quality of most course taught as special topics.	1/19/2016 10:23 AM
#	Comments for "Frequency of the special topic's courses offered after the core courses"	Date
1	These respond to the level of demand. I think that this is fine.	1/19/2016 12:39 PM
2	The frequency at which special topics courses should be modulated by each division. In particular, it important to avoid that the same special topic course be taught every year.	1/19/2016 10:23 AM
#	Comments for "Quality of ethics training related to chemical research as incorporated in curriculum or in orientation"	Date
1	Important to deal with plagiarism and other matters. Students don't always understand this issue in working problems in classes nor writing documents up for classes and seminars.	1/19/2016 12:39 PM
2	I think somehow our students learn ethics mostly by themselves or imitating others. We are lucky that our student body is comprised of honest people. It is unnecessary to teach an honest person to respect the ideas and the work of other people.	1/19/2016 10:23 AM
3	Almost nonexistent. I know of students in the past caught in academic dishonesty (proven over sufficient or reasonable doubt) that were kept in the school due to mentor petition and intervention. Yes, just like a tribe, when the leader speaks everybody rests.	1/12/2016 3:33 PM
4	Should be a frequent discussion	12/15/2015 1:04 PM
#	Comments for "Access to off-site internships and locations for collaborative research opportunities"	Date
1	There are many opportunities for students to learn new skills and access needed facilities in other universities/government labs/industries. We have historically been pretty good at arranging these opportunities for students.	1/19/2016 12:39 PM
2	More opportunities are needed for our students.	1/19/2016 10:23 AM
3	Co-opt program needed for graduate students.	1/12/2016 6:17 AM
#	Comments for "Course requirements to complete degree (number of credits required)"	Date
1	I'm ok with this.	1/19/2016 12:39 PM
2	I think this is satisfactory, but need constant revision. A "new liberal" extreme option would be to eliminate courses and requirement to convert the student in the hands of the mentor in the laboratory. My experience teaching the physical chemistry core courses for 25 years is that our students come with serious academic deficiencies.	1/19/2016 10:23 AM
3	Too extensive.	1/12/2016 7:30 AM
4	Number of credits should be reduced.	1/12/2016 6:17 AM
#	Comments for "Quantity of other graduate program degree requirements"	Date
1	Appropriate	1/19/2016 12:39 PM
2	The spirit of our curriculum is not well understood by some of the junior faculty member. The idea of the core course I just presented in the item above. The idea of the proposal A is to stimulate that the student is acquainted with the literature relevant to his or her research area (some believe is a thesis defense!). Proposal B is a great opportunity to learn how to plan and to write. In addition, proposal B takes the student out of his or her zone of confort. For me this has a value. In general, the spirit our curriculum is to provide students with the necessary tools to become a competent scientists. The student cannot learn everything from his or her mentor.	1/19/2016 10:23 AM
3	Too many, Too archaic	1/12/2016 3:33 PM
4	Too much make students take too long to graduate. Reduce them to the essential.	1/12/2016 6:17 AM
#	Comments for "Pre-requisites for admission (are they enough?) "	Date
1	Better now. Fewer dropouts now.	1/19/2016 12:39 PM
2	We have been lucky that we attract smart students. But many of them have deficiencies. Most of them are removed during the first year. This is the game we have been playing for many years. To attract students with a higher level of development we have to improve our image and our recruiting strategies.	1/19/2016 10:23 AM
3	Again. The rule establish some parameters that we never follow...	1/12/2016 3:33 PM

4	Admission standards are as low as the quality of our facilities.	1/12/2016 7:30 AM
#	Comments for "Convenience of the courses' time schedule"	Date
1	In order to expand the number of students that apply to the program a more flexible schedule may be considered	2/8/2016 9:26 AM
2	Graduate courses should be taught after 4:30 so that students can start to do research their second semester.	1/25/2016 7:26 PM
3	Few complaints.	1/19/2016 12:39 PM
4	Bad. The student is captured all morning. We should have more flexible itineraries.	1/12/2016 3:33 PM
#	Comments for "Graduate student seminar as a learning tool for problem solving and to conduct independent studies"	Date
1	Sometimes the topic are not at the addecuate level	2/8/2016 9:26 AM
2	I'm a big fan of this activity as an overall development tool.	1/19/2016 12:39 PM
3	In our professional lives we need to gain confidence. It is not so simple to out of the sudden go to an international meeting a make a successful presentation. I believe part of the objective of graduate education is to teach students how to communicate orally.	1/19/2016 10:23 AM
4	I like the idea of the seminar... Maybe is not a problem solving tool. To me saying this is an overstatement.	1/12/2016 3:33 PM
5	I don't think the description matches the current status of the graduate program.	1/12/2016 9:53 AM
#	Comments for "Proposal A as a learning tool to facilitate the organization and planning of the thesis project"	Date
1	Absolutely	1/19/2016 12:39 PM
2	Proposal A is the first encounter of the student with his or her mentor. The Committee evaluate the plan of the student, confirms that the students read the relevant literature, identifies deficiencies and make suggestions. The Committee members may comment on the amount and the breadth of the proposed project. In other words, The Committee matt warn the mentor that the work is to extensive to be accomplished in a few years.	1/19/2016 10:23 AM
3	Yes it is!	1/12/2016 3:33 PM
#	Comments for "Proposal B as a learning tool for problem solving and to conduct independent studies in new areas of your discipline as preparation for a professional career"	Date
1	Faculty should be better prepared (myself included).	1/19/2016 12:39 PM
2	It is an excellent learning experience.	1/19/2016 10:23 AM
3	I dont think is necessary.. We should have a seminar to cover this.	1/12/2016 3:33 PM
4	I don't think the description matches the current status of the proposal B.	1/12/2016 9:53 AM
5	I believe students should strictly focus on their dissertation work after proposal A.	1/12/2016 7:30 AM

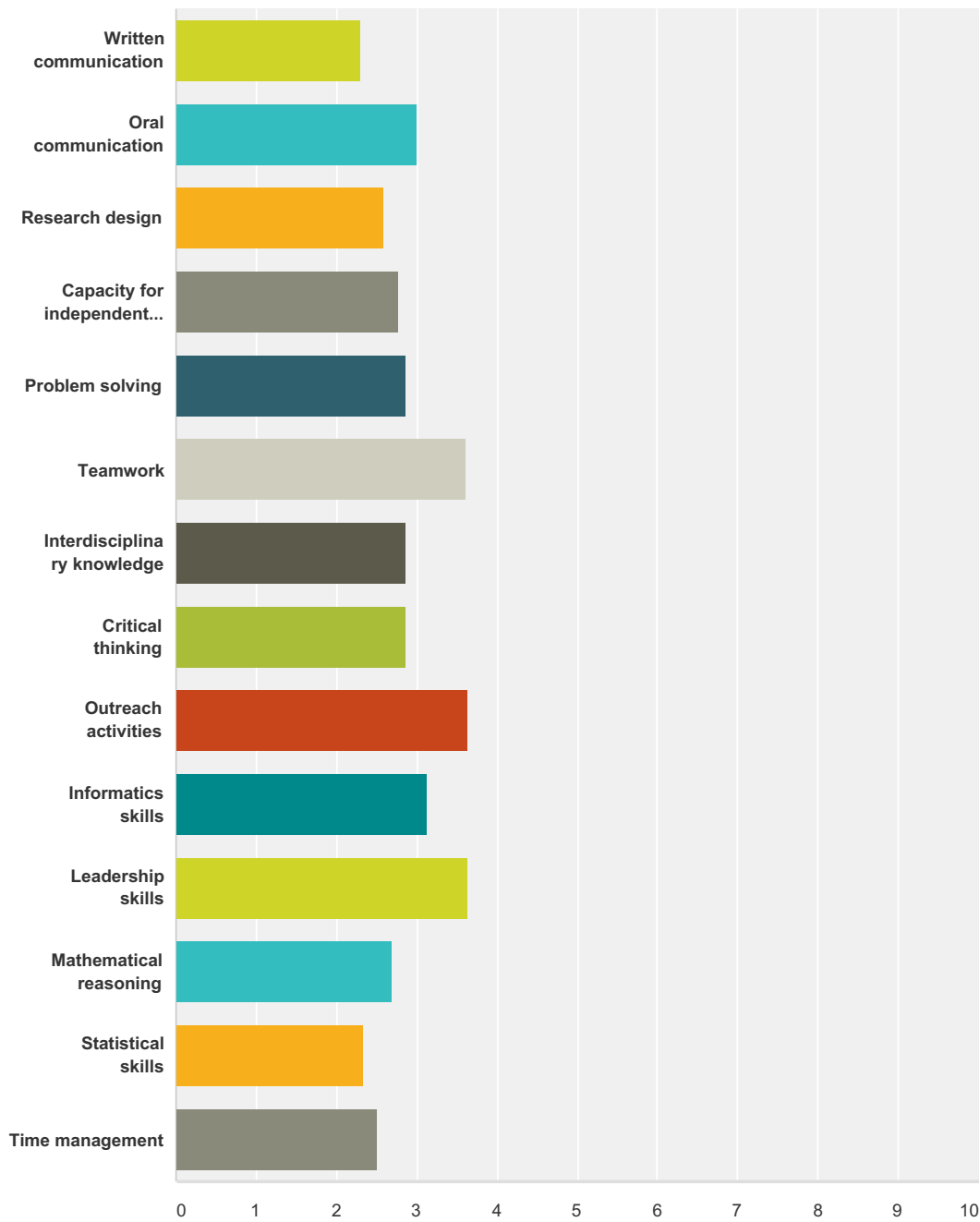
Q5 If you can recommend three to five new courses for the program, what would they be? Explain why and provide comments, please.

Answered: 11 Skipped: 3

#	Responses	Date
1	Scientific writing (including papers and proposals); Instrumental Analysis Laboratory including state of the art instrumentation such as HPLCMS, Crystallography, SEM, XPS among other techniques	2/8/2016 9:26 AM
2	Chemical biology course	1/25/2016 7:26 PM
3	Leave this for younger faculty to decide.	1/19/2016 12:39 PM
4	Nano chemistry, material sciences, biophysics, catalysis	1/19/2016 10:23 AM
5	Computer modeling Medicinal Chemistry Microbiology for Chemists	1/19/2016 10:00 AM
6	None	1/13/2016 3:29 PM
7	Analytical electrochemistry Chemistry of materials Bionanomaterials for the chemical field	1/12/2016 3:33 PM
8	I think core courses should be separated by areas of specialty. Separations, Mass spectrometry, Biochemical techniques, Organometalics, etc.	1/12/2016 9:53 AM
9	More special topics instead of core courses.	1/12/2016 7:30 AM
10	Case Studies on Ethics in Chemistry History of Chemistry Scientific Writing and Presentations Environmental and Industrial Chemistry: Laws and Regulations Statistics for Chemists	1/12/2016 6:17 AM
11	Polymer chemistry, scientific writing,	12/14/2015 9:28 AM

Q6 Student skills: How would you rate first-year students in terms of their ability to perform the following skills?

Answered: 14 Skipped: 0

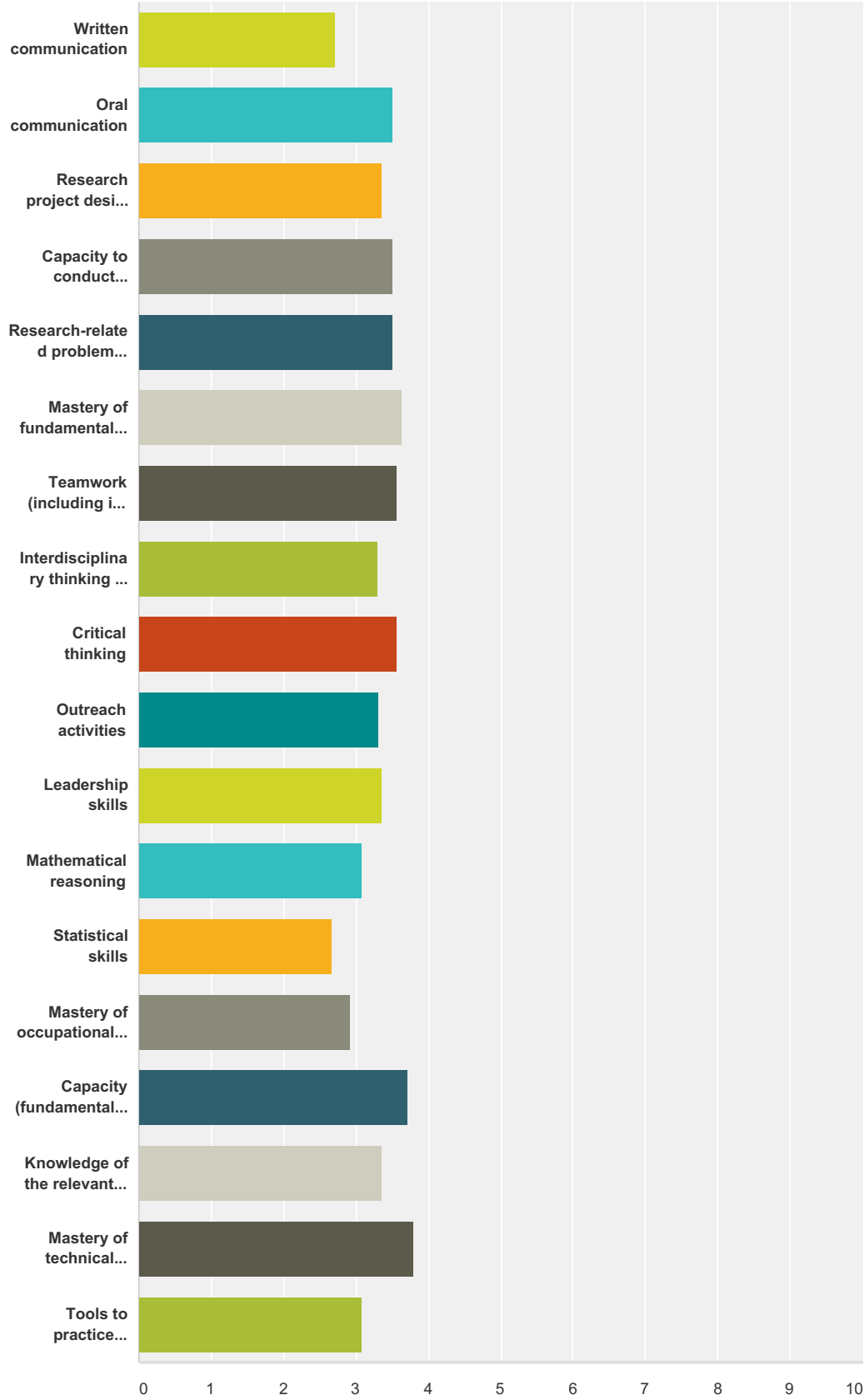


	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
Written communication	0.00% 0	78.57% 11	14.29% 2	7.14% 1	0.00% 0	0.00% 0	14	2.29
Oral communication	0.00% 0	35.71% 5	28.57% 4	35.71% 5	0.00% 0	0.00% 0	14	3.00

Research design	0.00% 0	42.86% 6	35.71% 5	7.14% 1	0.00% 0	14.29% 2	14	2.58
Capacity for independent research	0.00% 0	28.57% 4	57.14% 8	7.14% 1	0.00% 0	7.14% 1	14	2.77
Problem solving	0.00% 0	35.71% 5	42.86% 6	21.43% 3	0.00% 0	0.00% 0	14	2.86
Teamwork	0.00% 0	7.14% 1	21.43% 3	64.29% 9	0.00% 0	7.14% 1	14	3.62
Interdisciplinary knowledge	0.00% 0	23.08% 3	69.23% 9	7.69% 1	0.00% 0	0.00% 0	13	2.85
Critical thinking	0.00% 0	21.43% 3	64.29% 9	7.14% 1	0.00% 0	7.14% 1	14	2.85
Outreach activities	0.00% 0	0.00% 0	30.77% 4	53.85% 7	0.00% 0	15.38% 2	13	3.64
Informatics skills	0.00% 0	21.43% 3	42.86% 6	35.71% 5	0.00% 0	0.00% 0	14	3.14
Leadership skills	0.00% 0	0.00% 0	50.00% 7	35.71% 5	14.29% 2	0.00% 0	14	3.64
Mathematical reasoning	0.00% 0	38.46% 5	53.85% 7	7.69% 1	0.00% 0	0.00% 0	13	2.69
Statistical skills	0.00% 0	61.54% 8	30.77% 4	0.00% 0	0.00% 0	7.69% 1	13	2.33
Time management	7.14% 1	42.86% 6	42.86% 6	7.14% 1	0.00% 0	0.00% 0	14	2.50

Q7 Capacity building: How would you rate the program in terms of the exposure to activities/courses that allow students to develop the following skills?

Answered: 14 Skipped: 0



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
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Written communication	0.00% 0	42.86% 6	50.00% 7	0.00% 0	7.14% 1	0.00% 0	14	2.71
Oral communication	0.00% 0	28.57% 4	0.00% 0	64.29% 9	7.14% 1	0.00% 0	14	3.50
Research project design and development	0.00% 0	21.43% 3	28.57% 4	42.86% 6	7.14% 1	0.00% 0	14	3.36
Capacity to conduct independent research	0.00% 0	14.29% 2	28.57% 4	50.00% 7	7.14% 1	0.00% 0	14	3.50
Research-related problem solving	0.00% 0	14.29% 2	21.43% 3	64.29% 9	0.00% 0	0.00% 0	14	3.50
Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines	0.00% 0	14.29% 2	14.29% 2	64.29% 9	7.14% 1	0.00% 0	14	3.64
Teamwork (including in diversity scenarios)	0.00% 0	0.00% 0	50.00% 7	42.86% 6	7.14% 1	0.00% 0	14	3.57
Interdisciplinary thinking and knowledge	0.00% 0	21.43% 3	35.71% 5	35.71% 5	7.14% 1	0.00% 0	14	3.29
Critical thinking	0.00% 0	7.14% 1	35.71% 5	50.00% 7	7.14% 1	0.00% 0	14	3.57
Outreach activities	0.00% 0	14.29% 2	35.71% 5	42.86% 6	0.00% 0	7.14% 1	14	3.31
Leadership skills	0.00% 0	7.14% 1	50.00% 7	42.86% 6	0.00% 0	0.00% 0	14	3.36
Mathematical reasoning	0.00% 0	14.29% 2	57.14% 8	21.43% 3	0.00% 0	7.14% 1	14	3.08
Statistical skills	0.00% 0	38.46% 5	46.15% 6	7.69% 1	0.00% 0	7.69% 1	13	2.67
Mastery of occupational safety and security laws, and environmental protection regulations	7.14% 1	28.57% 4	35.71% 5	21.43% 3	7.14% 1	0.00% 0	14	2.93
Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry	0.00% 0	7.14% 1	21.43% 3	64.29% 9	7.14% 1	0.00% 0	14	3.71
Knowledge of the relevant scientific literature and the ability to use it in problem solving	0.00% 0	28.57% 4	14.29% 2	50.00% 7	7.14% 1	0.00% 0	14	3.36
Mastery of technical skills required for a chemical professional	0.00% 0	7.14% 1	21.43% 3	57.14% 8	14.29% 2	0.00% 0	14	3.79
Tools to practice ethical conduct on their professional career	0.00% 0	23.08% 3	46.15% 6	30.77% 4	0.00% 0	0.00% 0	13	3.08

#	Comments for "Written communication"	Date
1	They are required to write a lot, prepared different projects , proposal , but there is not a formal course that teach them to do it.	2/8/2016 9:26 AM
2	Teach students to write regular (monthly) research reports to be paid.	1/19/2016 12:39 PM
3	We dont have a course designed to teach students in this area.	1/12/2016 3:33 PM
4	Without a formal science writing course, capacity building in this aspect is limited.	1/12/2016 6:17 AM
#	Comments for "Oral communication"	Date
1	All courses/activities are in English.	1/19/2016 12:39 PM
2	Group meetings, graduate seminar, and Proposals A and B bring enough opportunities to build this capacity.	1/12/2016 6:17 AM
#	Comments for "Research project design and development"	Date

1	to the best of my knowledge, in addition to individual mentor-ship offered by the each researchers to their students, there are not available course or workshop of this nature.	2/8/2016 9:26 AM
2	Get students into groups and attending group meetings ASAP.	1/19/2016 12:39 PM
3	This is mainly through the mentorship, but requiring research proposals in graduate courses can improve this.	1/12/2016 6:17 AM
#	Comments for "Capacity to conduct independent research"	Date
1	Big problem. Very dependent on the advisor/group the student is in.	1/19/2016 12:39 PM
2	This is also one of the things that the mentor should help with.	1/12/2016 3:33 PM
#	Comments for "Research-related problem solving"	Date
1	Big problem. Very dependent on the advisor/group the student is in.	1/19/2016 12:39 PM
2	Depends on the student and we are providing limited tools for this.	1/12/2016 3:33 PM
#	Comments for "Mastery of fundamental chemistry concepts, its applications, and its relation to other scientific disciplines"	Date
1	Many professors are memorizers (historians not scientists)	1/19/2016 12:39 PM
2	When I attend student presentation seminars I can identify conceptual problems. In part, this is because some lack a strong preparation in physical chemistry.	1/19/2016 10:23 AM
#	Comments for "Teamwork (including in diversity scenarios)"	Date
1	Students generally work well together.	1/19/2016 12:39 PM
2	This is one of the dilemmas we face: students have to write a thesis in a subject they developed independently, yet we expect that they work as a team. The way PhD programs are designed does not automatically foster team work. However, members of a research groups should be encourage to cooperate and to exchange ideas.	1/19/2016 10:23 AM
#	Comments for "Interdisciplinary thinking and knowledge"	Date
1	Too much focus on "Tell me what I need to do and need to know". Seminars help.	1/19/2016 12:39 PM
#	Comments for "Critical thinking"	Date
1	Big problem. Very dependent on the advisor/group the student is in. It is not integrated into the culture.	1/19/2016 12:39 PM
#	Comments for "Outreach activities"	Date
1	Not sure.	1/19/2016 12:39 PM
2	Unfortunately, our students are overworked because we lack support from the University. However, we should teach our students to help others. This may be done through voluntary work.	1/19/2016 10:23 AM
3	Much more is needed; CGP needs to be known by the outside community. Frequent Science Cafés? Saturday morning science workshops, talks, activities for children, their parents and family, and the general public?	1/12/2016 6:17 AM
#	Comments for "Leadership skills"	Date
1	These are skills that you can develop in research meetings.	1/19/2016 12:39 PM
#	Comments for "Mathematical reasoning"	Date
1	Take PChem.	1/19/2016 12:39 PM
2	Some of the research areas we are pursuing do not require extensive use of mathematical expressions. Our curriculum it is not focused in this direction. In the old days a physical chemistry course was required.	1/19/2016 10:23 AM
#	Comments for "Statistical skills"	Date
1	These are skills that you can develop in research related to your data processing.	1/19/2016 12:39 PM
2	Students learn numerous statistical concepts in the undergraduate physical chemistry laboratory. I believe this adequate except for physical chemistry students. How much is enough is a question that deserves discussion.	1/19/2016 10:23 AM
3	We have failed to teach our students some of this...	1/12/2016 3:33 PM
4	Too many students reach final stages of graduate work without knowing basic statistical skills.	1/12/2016 6:17 AM
#	Comments for "Mastery of occupational safety and security laws, and environmental protection regulations"	Date
1	These are skills that you can develop in research meetings. We have had EP present information to our group in this regard.	1/19/2016 12:39 PM

2	More need to be done. This is something that the Faculty alone cannot do. The University should provide personnel and resources.	1/19/2016 10:23 AM
3	What is required by law to employees in chemical-related industries are not yet being presented to students.	1/12/2016 6:17 AM
#	Comments for "Capacity (fundamental and technical skills) to become a specialist in a subspecialty in a chemistry field: analytical, biochemistry, physical, inorganic, and organic chemistry"	Date
1	The graduate program is not offering enough course in each area	2/8/2016 9:26 AM
2	These are areas that you can develop in core courses and research group meetings and lab work and National Meetings.	1/19/2016 12:39 PM
3	This what a PhD program is all about. To produce a specialist in a single subject expecting that this person will be able to confront new problems and implement creative ideas to reach a practical solution. I have listen to numerous student thesis seminars and I am confident that they really understand their subject and are ready to start and independent career.	1/19/2016 10:23 AM
#	Comments for "Knowledge of the relevant scientific literature and the ability to use it in problem solving"	Date
1	Bring back cumes.	1/19/2016 12:39 PM
#	Comments for "Mastery of technical skills required for a chemical professional"	Date
1	These are skills that you can develop in the laboratory.	1/19/2016 12:39 PM
#	Comments for "Tools to practice ethical conduct on their professional career"	Date
1	These are areas that the research advisor should address in research meetings.	1/19/2016 12:39 PM
2	We need to include more seminars in this subject. Not necessarily from the philosophical point of view, but more related to the professional practice.	1/19/2016 10:23 AM

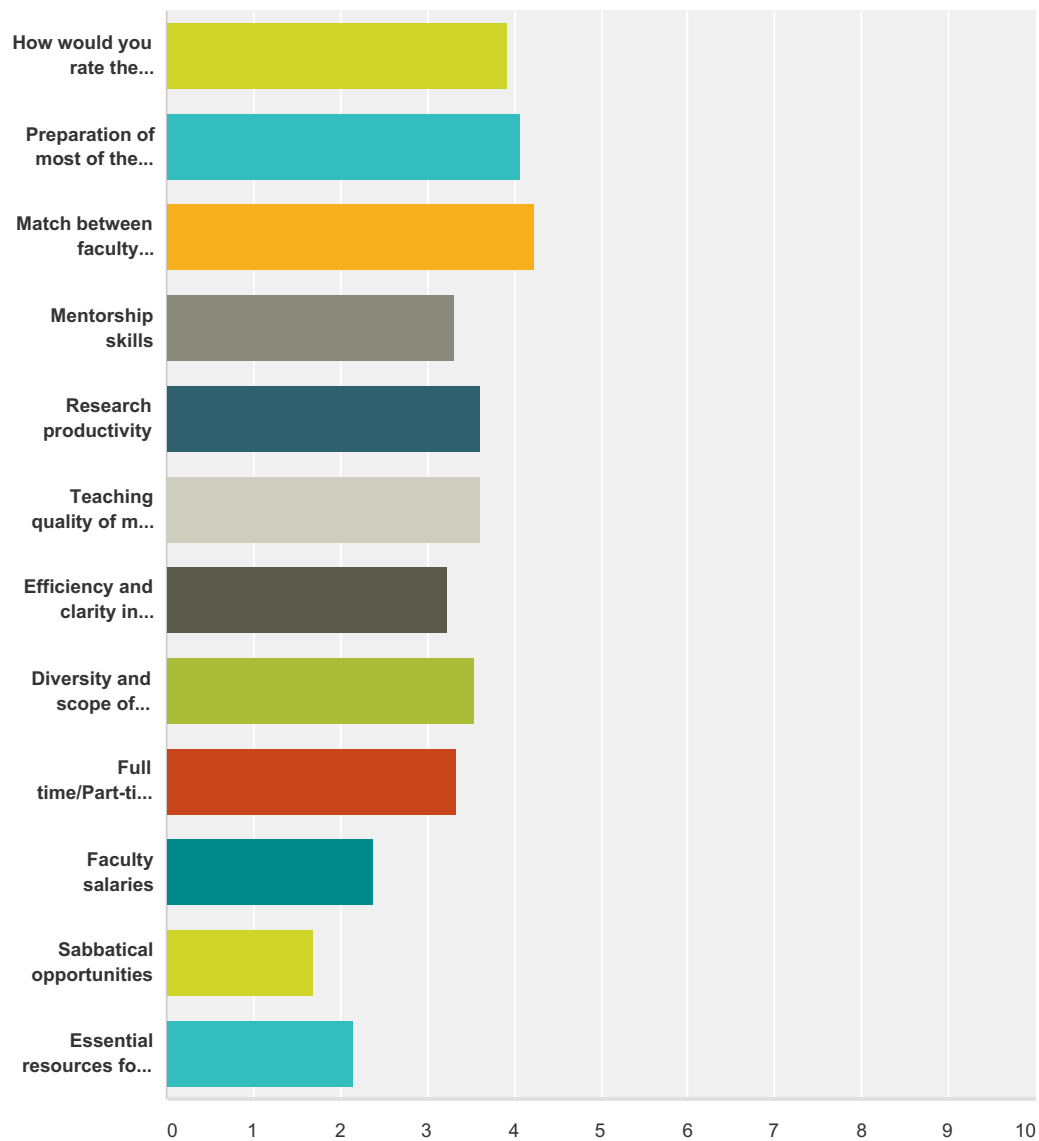
Q8 What modifications, if any, would you suggest to enrich the curriculum?

Answered: 10 Skipped: 4

#	Responses	Date
1	Include novel courses in each discipline, include scientific writing and Research project design and development courses or workshops	2/8/2016 9:26 AM
2	Technical writing in English.	1/25/2016 7:26 PM
3	Continue to recruit and develop quality faculty.	1/19/2016 12:39 PM
4	We should create courses, perhaps involving several professors, to present new concept.	1/19/2016 10:23 AM
5	This survey is exhausting! Too long already!	1/19/2016 10:00 AM
6	None	1/13/2016 3:29 PM
7	Less course work. More seminars. Using creative ways to reach the student.	1/12/2016 3:33 PM
8	Online access to more scientific journals, more extra curricular courses and less focus on core course material to create more unique PhDs, create journal clubs to discuss current cutting edge scientific research, create seminar courses for each division independently parallel to the main seminar course.	1/12/2016 7:30 AM
9	Conduct surveys of former students every 5 years and ask them to give suggestions of what courses they wished that would have been able to take if they could go back to graduate school. That can be a basis for discussion on how to enrich the curriculum.	1/12/2016 6:17 AM
10	Revise core courses	12/14/2015 9:28 AM

Q9 Part C. (1) Faculty

Answered: 13 Skipped: 1



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
How would you rate the graduate faculty overall?	0.00% 0	0.00% 0	15.38% 2	76.92% 10	7.69% 1	0.00% 0	13	3.92
Preparation of most of the professors	0.00% 0	0.00% 0	23.08% 3	46.15% 6	30.77% 4	0.00% 0	13	4.08
Match between faculty expertise and course offerings	0.00% 0	0.00% 0	7.69% 1	61.54% 8	30.77% 4	0.00% 0	13	4.23
Mentorship skills	0.00% 0	7.69% 1	53.85% 7	38.46% 5	0.00% 0	0.00% 0	13	3.31
Research productivity	0.00% 0	15.38% 2	15.38% 2	61.54% 8	7.69% 1	0.00% 0	13	3.62

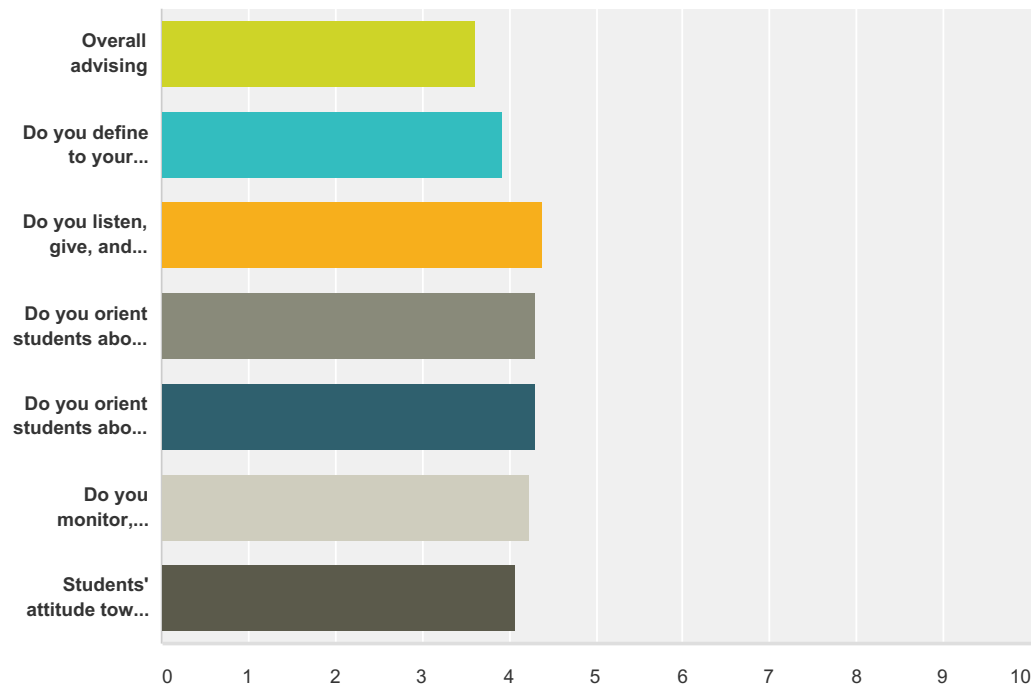
Teaching quality of most of the professors	0.00% 0	0.00% 0	38.46% 5	61.54% 8	0.00% 0	0.00% 0	13	3.62
Efficiency and clarity in faculty evaluation reporting	0.00% 0	23.08% 3	38.46% 5	30.77% 4	7.69% 1	0.00% 0	13	3.23
Diversity and scope of research areas	0.00% 0	7.69% 1	30.77% 4	61.54% 8	0.00% 0	0.00% 0	13	3.54
Full time/Part-time faculty ratio	7.69% 1	0.00% 0	38.46% 5	46.15% 6	0.00% 0	7.69% 1	13	3.33
Faculty salaries	15.38% 2	46.15% 6	23.08% 3	15.38% 2	0.00% 0	0.00% 0	13	2.38
Sabbatical opportunities	53.85% 7	30.77% 4	7.69% 1	7.69% 1	0.00% 0	0.00% 0	13	1.69
Essential resources for faculty, teaching, and productivity	15.38% 2	53.85% 7	30.77% 4	0.00% 0	0.00% 0	0.00% 0	13	2.15

#	Comments for "How would you rate the graduate faculty overall?"	Date
1	More diversity needed. Don't hire our PhD graduates for research positions.	1/19/2016 12:52 PM
#	Comments for "Preparation of most of the professors"	Date
1	It is improving, but we need to insist on increasing diversity so that we can attract students to be a part of new research areas.	1/19/2016 12:52 PM
#	Comments for "Match between faculty expertise and course offerings"	Date
1	There is a good match-up to assure quality courses.	1/19/2016 12:52 PM
#	Comments for "Mentorship skills"	Date
1	This is a weakness that is improving.	1/19/2016 12:52 PM
#	Comments for "Research productivity"	Date
1	I think that we are doing pretty well considering the economics of the Island and available resources.	1/19/2016 12:52 PM
2	...	1/12/2016 3:36 PM
#	Comments for "Teaching quality of most of the professors"	Date
1	This is generally fine.	1/19/2016 12:52 PM
#	Comments for "Efficiency and clarity in faculty evaluation reporting"	Date
1	I don't see problems here.	1/19/2016 12:52 PM
#	Comments for "Diversity and scope of research areas"	Date
1	Ok	1/19/2016 12:52 PM
#	Comments for "Full time/Part-time faculty ratio"	Date
1	This applies to undergraduate teaching.	1/25/2016 7:28 PM
2	Ok	1/19/2016 12:52 PM
#	Comments for "Faculty salaries"	Date
1	Better than before. Low relative to Stateside.	1/19/2016 12:52 PM
2	At least the research professors are very much underpaid to all the work we have to do.	1/12/2016 3:36 PM
3	Salaries continue to be low.	12/14/2015 9:32 AM
#	Comments for "Sabbatical opportunities"	Date
1	Fine	1/19/2016 12:52 PM
2	Start approving sabbatical applications	1/13/2016 3:31 PM
3	First time I hear this term.	1/12/2016 3:36 PM

4	Sabbatical opportunities should be available constantly, with professors able to take a sabbatical leave every 5-7 years.	1/12/2016 6:22 AM
5	Sabbaticals should return in a constant basis. The opportunity to engage in an extended period of professional renewal is important to maintain the vitality of our graduate program.	12/14/2015 9:32 AM
#	Comments for "Essential resources for faculty, teaching, and productivity"	Date
1	We need preventative maintenance.	1/19/2016 12:52 PM
2	We need to have more respect for our professors.	1/12/2016 3:36 PM
3	Need basic infrastructure maintenance, more classrooms, consistent internet access in classrooms, support for online teaching, better grant management support.	1/12/2016 6:22 AM

Q10 Part C. (2) Mentor

Answered: 13 Skipped: 1



	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
Overall advising	0.00% 0	0.00% 0	38.46% 5	61.54% 8	0.00% 0	0.00% 0	13	3.62
Do you define to your students a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?	0.00% 0	15.38% 2	0.00% 0	61.54% 8	23.08% 3	0.00% 0	13	3.92
Do you listen, give, and receive feedback, and respond perceptively to their questions?	0.00% 0	0.00% 0	15.38% 2	30.77% 4	53.85% 7	0.00% 0	13	4.38
Do you orient students about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?	0.00% 0	0.00% 0	15.38% 2	38.46% 5	46.15% 6	0.00% 0	13	4.31
Do you orient students about relevant health and safety issues in the laboratory and demonstrate responsible working practices?	0.00% 0	0.00% 0	15.38% 2	38.46% 5	46.15% 6	0.00% 0	13	4.31
Do you monitor, document, reflect, and report on the students' progress?	0.00% 0	0.00% 0	15.38% 2	46.15% 6	38.46% 5	0.00% 0	13	4.23
Students' attitude toward advisor mentoring	0.00% 0	0.00% 0	15.38% 2	61.54% 8	23.08% 3	0.00% 0	13	4.08

#	Comments for "Overall advising"	Date
1	Generally ok, but there are weaknesses in the faculty.	1/19/2016 1:01 PM
#	Comments for "Do you define to your students a realistic overall plan and timeline to complete the research with milestones for every aspect of the plan?"	Date

1	The plan is result-driven. Invention is not just putting in your time.	1/19/2016 1:01 PM
2	Yes I do. I took a course in Project Management (my pocket paid for it) in order to be able to do this. Good researcher doesn't mean good mentor or manager...	1/12/2016 3:38 PM
#	Comments for "Do you listen, give, and receive feedback, and respond perceptively to their questions?"	Date
1	Always	1/19/2016 1:01 PM
#	Comments for "Do you orient students about issues relating to the rights of other researchers, research subjects, and others who may be affected by the research, e.g. confidentiality, ethical issues, attributions, copyright, malpractice, and ownership of data?"	Date
1	Absolutely and emphatically.	1/19/2016 1:01 PM
2	Last semester gave my students a seminar on research ethics and publishing ethics.	1/12/2016 3:38 PM
#	Comments for "Do you orient students about relevant health and safety issues in the laboratory and demonstrate responsible working practices?"	Date
1	Thirty-two years and no major injuries.	1/19/2016 1:01 PM
#	Comments for "Do you monitor, document, reflect, and report on the students' progress?"	Date
1	I do as per university practices and evaluation and support agency requirements. Above that, I know where my students are in their projects.	1/19/2016 1:01 PM
2	Not all the time	1/12/2016 3:38 PM
#	Comments for "Students' attitude toward advisor mentoring"	Date
1	I have had only one student quit my group as a graduate student (27 PhDs).	1/19/2016 1:01 PM
2	They like it...	1/12/2016 3:38 PM

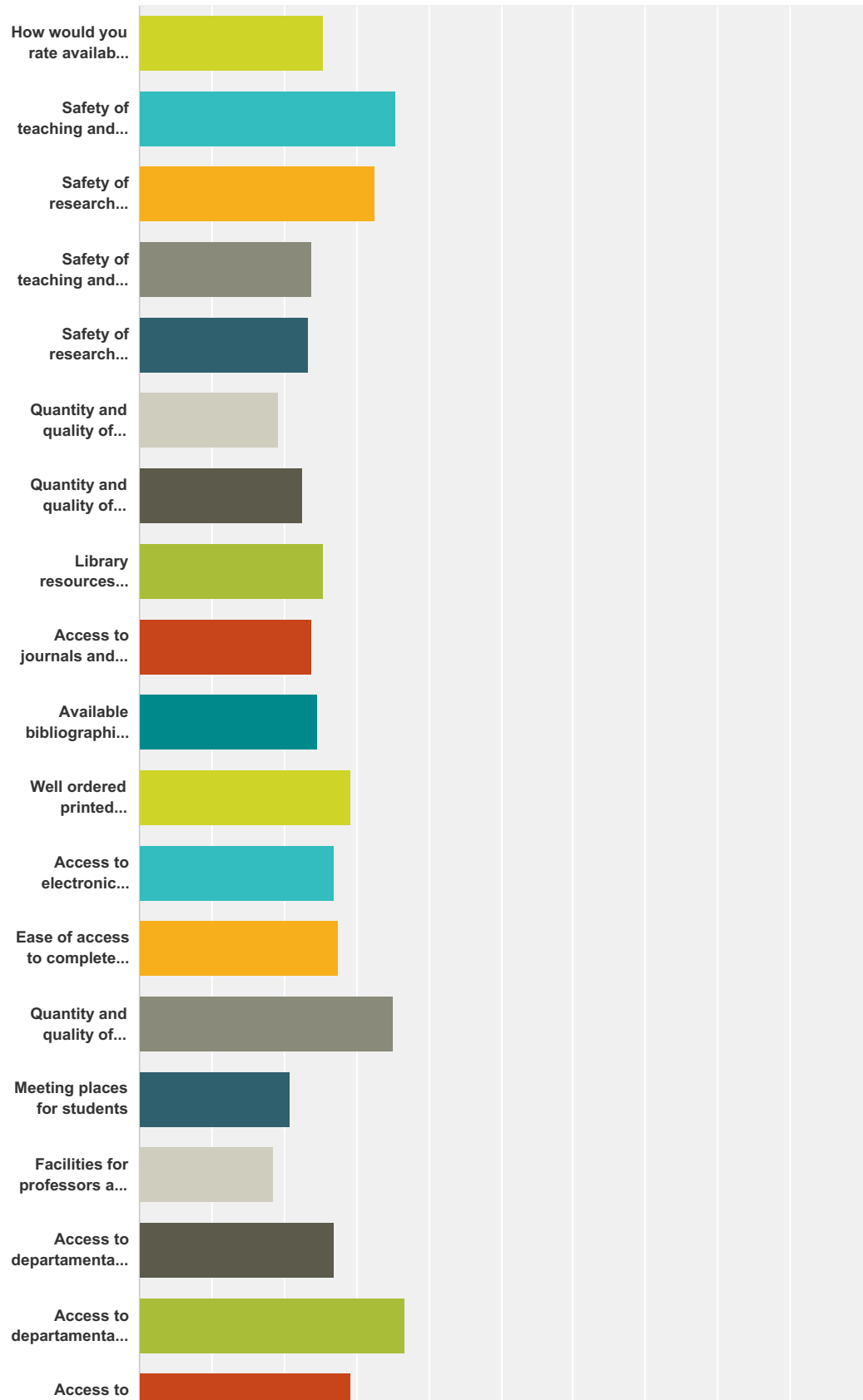
Q11 Which recommendations can you give to improve the student experience in the graduate program?

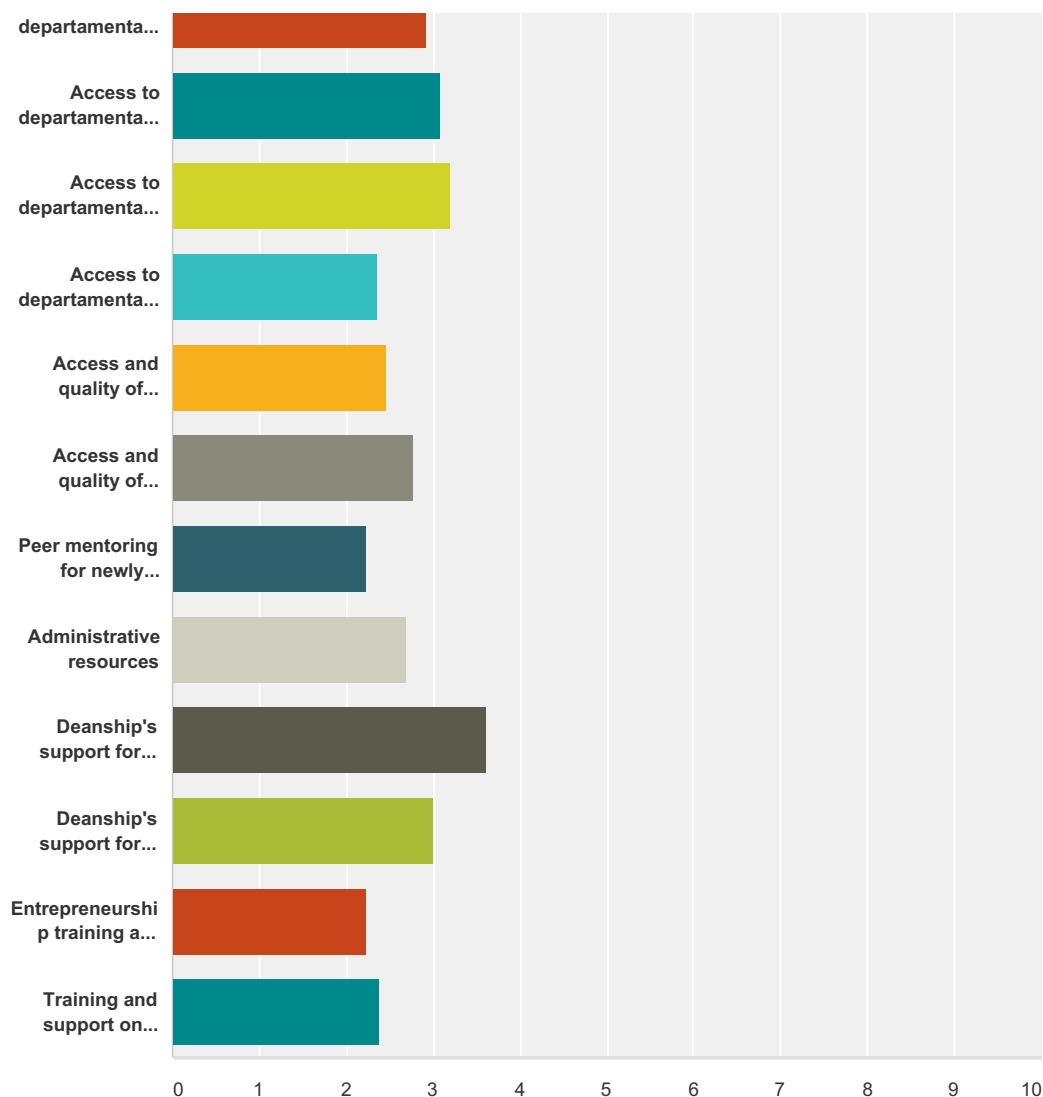
Answered: 6 Skipped: 8

#	Responses	Date
1	Get to work in the lab ASAP.	1/19/2016 1:01 PM
2	This question is too general. But the student has to make sure that he or she makes substantial progress every semester. Otherwise, identify the problem. This may require project change, help from an expert. The student Committee should make sure that every students makes progress. It is not acceptable to be in a professional school without progress.	1/19/2016 10:35 AM
3	None	1/13/2016 3:32 PM
4	...	1/12/2016 3:38 PM
5	Functioning research facilities	1/12/2016 7:34 AM
6	Improve mentoring and a professional environment where students opinions are valued and students are more recognized as essential members of the academic community. Proaivide more activities aimed at students' interactions outside the lab.	1/12/2016 6:27 AM

Q12 Essential resources for faculty, teaching, productivity, and research

Answered: 13 Skipped: 1





	Very deficient	Deficient	Neutral	Satisfactory	Very satisfactory	N/A	Total	Weighted Average
How would you rate available resources for teaching and research by faculty and students?	7.69% 1	46.15% 6	30.77% 4	15.38% 2	0.00% 0	0.00% 0	13	2.54
Safety of teaching and studying facilities from 8:00 am to 5:00 pm	0.00% 0	15.38% 2	30.77% 4	38.46% 5	15.38% 2	0.00% 0	13	3.54
Safety of research facilities from 8:00 am to 5:00 pm	0.00% 0	25.00% 3	25.00% 3	50.00% 6	0.00% 0	0.00% 0	12	3.25
Safety of teaching and studying facilities during night	7.69% 1	53.85% 7	30.77% 4	7.69% 1	0.00% 0	0.00% 0	13	2.38
Safety of research facilities during night	8.33% 1	58.33% 7	25.00% 3	8.33% 1	0.00% 0	0.00% 0	12	2.33
Quantity and quality of classrooms	23.08% 3	69.23% 9	0.00% 0	7.69% 1	0.00% 0	0.00% 0	13	1.92
Quantity and quality of research laboratories	16.67% 2	50.00% 6	25.00% 3	8.33% 1	0.00% 0	0.00% 0	12	2.25
Library resources available through campus	15.38% 2	38.46% 5	30.77% 4	7.69% 1	7.69% 1	0.00% 0	13	2.54

Access to journals and adequate and sufficient bibliographic resources to develop and sustain research.	15.38% 2	61.54% 8	0.00% 0	15.38% 2	7.69% 1	0.00% 0	13	2.38
Available bibliographic resources needed for the optimum functioning of the Chemistry Graduate Program	7.69% 1	69.23% 9	0.00% 0	15.38% 2	7.69% 1	0.00% 0	13	2.46
Well ordered printed bibliographic resources in the library and in good shape	0.00% 0	30.77% 4	46.15% 6	7.69% 1	7.69% 1	7.69% 1	13	2.92
Access to electronic bibliographic resources when the students or faculty need them	7.69% 1	53.85% 7	7.69% 1	23.08% 3	7.69% 1	0.00% 0	13	2.69
Ease of access to complete version of electronic bibliographic resources	8.33% 1	33.33% 4	41.67% 5	8.33% 1	8.33% 1	0.00% 0	12	2.75
Quantity and quality of off-campus research facilities (Molecular Sciences Research Center)	0.00% 0	30.77% 4	15.38% 2	15.38% 2	30.77% 4	7.69% 1	13	3.50
Meeting places for students	23.08% 3	46.15% 6	30.77% 4	0.00% 0	0.00% 0	0.00% 0	13	2.08
Facilities for professors and students with children	38.46% 5	38.46% 5	23.08% 3	0.00% 0	0.00% 0	0.00% 0	13	1.85
Access to departmental research facilities-Nanoscopy facility	15.38% 2	7.69% 1	38.46% 5	15.38% 2	0.00% 0	23.08% 3	13	2.70
Access to departmental research facilities-NMR facility	0.00% 0	7.69% 1	38.46% 5	23.08% 3	23.08% 3	7.69% 1	13	3.67
Access to departmental research facilities-MS facility	7.69% 1	15.38% 2	46.15% 6	23.08% 3	0.00% 0	7.69% 1	13	2.92
Access to departmental research facilities-Surface science facility	7.69% 1	7.69% 1	46.15% 6	30.77% 4	0.00% 0	7.69% 1	13	3.08
Access to departmental research facilities-X-ray crystallography facility	0.00% 0	30.77% 4	7.69% 1	30.77% 4	7.69% 1	23.08% 3	13	3.20
Access to departmental research facilities-Biotesting facility	15.38% 2	30.77% 4	30.77% 4	7.69% 1	0.00% 0	15.38% 2	13	2.36
Access and quality of office/working space for students	7.69% 1	53.85% 7	23.08% 3	15.38% 2	0.00% 0	0.00% 0	13	2.46
Access and quality of office/working space for faculty	0.00% 0	46.15% 6	30.77% 4	23.08% 3	0.00% 0	0.00% 0	13	2.77
Peer mentoring for newly recruited faculty	7.69% 1	61.54% 8	30.77% 4	0.00% 0	0.00% 0	0.00% 0	13	2.23
Administrative resources	0.00% 0	46.15% 6	46.15% 6	0.00% 0	7.69% 1	0.00% 0	13	2.69
Deanship's support for proposal submission	0.00% 0	7.69% 1	30.77% 4	53.85% 7	7.69% 1	0.00% 0	13	3.62
Deanship's support for laboratory maintenance	0.00% 0	30.77% 4	46.15% 6	15.38% 2	7.69% 1	0.00% 0	13	3.00
Entrepreneurship training and support	15.38% 2	46.15% 6	38.46% 5	0.00% 0	0.00% 0	0.00% 0	13	2.23
Training and support on intellectual property protection, patents, licensing, start-ups	23.08% 3	23.08% 3	46.15% 6	7.69% 1	0.00% 0	0.00% 0	13	2.38

#	Comments for "How would you rate available resources for teaching and research by faculty and students?"	Date
1	The place is rundown and there is little or no preventative maintenance.	1/19/2016 1:34 PM

2	Orders of chemicals take too long to get here, instrumentation is not available on a 24/7 basis with clear and fair reservation system.	1/12/2016 6:42 AM
#	Comments for "Safety of teaching and studying facilities from 8:00 am to 5:00 pm"	Date
1	There is not security	2/8/2016 9:31 AM
2	We have security people everywhere, and I have never felt threatened. However, there have been occasional serious problems on campus.	1/19/2016 1:34 PM
#	Comments for "Safety of research facilities from 8:00 am to 5:00 pm"	Date
1	We have security people everywhere, and I have never felt threatened. However, there have been occasional serious problems on campus.	1/19/2016 1:34 PM
#	Comments for "Safety of teaching and studying facilities during night"	Date
1	There are not safety but security problems.	1/25/2016 7:42 PM
2	This is more of an issue. I make sure that women graduate students are escorted to their cars when they go home. It is better, but not perfectly safe.	1/19/2016 1:34 PM
3	Not good at all	1/12/2016 3:50 PM
#	Comments for "Safety of research facilities during night"	Date
1	Critical mass of students is needed to make the labs after.	1/25/2016 7:42 PM
2	There have been some problems with robberies.	1/19/2016 1:34 PM
3	Very bad... No emergency response, no primary help in case of accident, etc etc.	1/12/2016 3:50 PM
4	Many times you do not see a safety guard late at night. Students constantly complain about this.	12/14/2015 9:40 AM
#	Comments for "Quantity and quality of classrooms"	Date
1	We need a meeting room and a seminar room.	1/25/2016 7:42 PM
2	Miserable	1/19/2016 1:34 PM
3	We have only 1	1/12/2016 3:50 PM
4	One classroom for a graduate school is not enough. Need at least 3-5.	1/12/2016 6:42 AM
5	We need one more room for teaching and proposal defense in Facundo Bueso	12/14/2015 9:40 AM
#	Comments for "Quantity and quality of research laboratories"	Date
1	Mixed, mostly deficient, except for recently renovated.	1/25/2016 7:42 PM
2	Variable	1/19/2016 1:34 PM
3	Good amount. Some of them are empty, don't have students.	1/12/2016 3:50 PM
4	Renovations on an old building that was not intended for research are not enough; we need a research building on campus.	1/12/2016 6:42 AM
5	Many laboratories are more than 30 years old. There are ongoing renovation plans but most facilities are really deficient. Hoods are a constant problem.	12/14/2015 9:40 AM
#	Comments for "Library resources available through campus"	Date
1	Very bad	1/19/2016 1:34 PM
2	Bad.	1/12/2016 3:50 PM
3	Need access to more scientific journals, there should be a unified library catalog system for all Puerto Rican universities and colleges, local libraries need more advanced science books (beyond undergraduate chemistry).	1/12/2016 7:52 AM
4	Easier access to online resources is needed. Currently available resources are not easily accessed because for many of them it is not obvious how to reach them online through our Natural Sciences library webpage or if our university has free access or not.	1/12/2016 6:42 AM
#	Comments for "Access to journals and adequate and sufficient bibliographic resources to develop and sustain research."	Date
1	Poor access to digital journals and abstracting services.	1/25/2016 7:42 PM
2	Very bad. I have to ask my friends in other universities for help all the time.	1/19/2016 1:34 PM

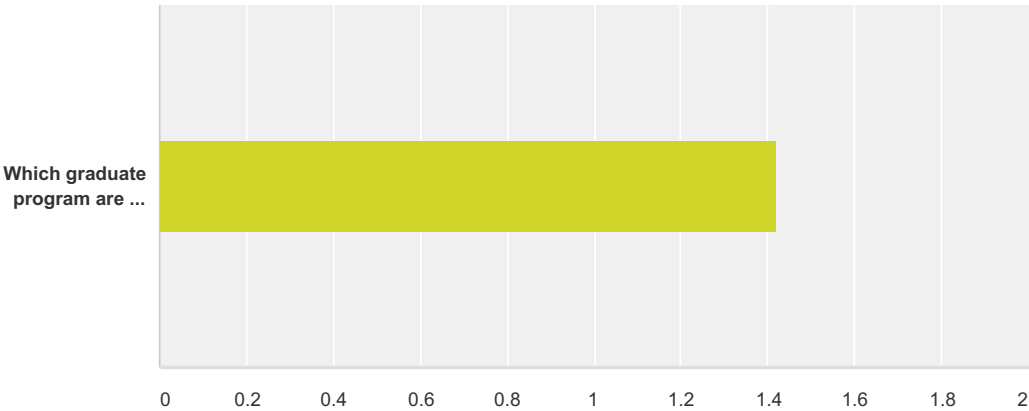
3	I have to ask a friend from a US university to find the papers for me. Sometimes when he is able to send them, I already change my research plans...	1/12/2016 3:50 PM
4	I often have to write to colleagues abroad to ask for papers published by most international publishers.	1/12/2016 7:52 AM
5	Same comment as for previous question.	1/12/2016 6:42 AM
6	We need more online resources.	12/14/2015 9:40 AM
#	Comments for "Available bibliographic resources needed for the optimum functioning of the Chemistry Graduate Program"	Date
1	I've given up on UPR.	1/19/2016 1:34 PM
2	Not functioning.	1/12/2016 3:50 PM
3	Same comment as for previous question.	1/12/2016 6:42 AM
4	We need more online resources.	12/14/2015 9:40 AM
#	Comments for "Well ordered printed bibliographic resources in the library and in good shape"	Date
1	I've given up on UPR.	1/19/2016 1:34 PM
2	Many outdated.	1/12/2016 6:42 AM
#	Comments for "Access to electronic bibliographic resources when the students or faculty need them"	Date
1	I've given up on UPR.	1/19/2016 1:34 PM
2	Ethernet access non-existing, wifi access very inconsistent.	1/12/2016 6:42 AM
#	Comments for "Ease of access to complete version of electronic bibliographic resources"	Date
1	I've given up on UPR.	1/19/2016 1:34 PM
2	Archaic. Please get an example from the Chemistry Library of Madison WI	1/12/2016 3:50 PM
#	Comments for "Quantity and quality of off-campus research facilities (Molecular Sciences Research Center)"	Date
1	Excellent facility for some. Not all researchers have full access.	1/25/2016 7:42 PM
2	This was a mistake. It divides resources and people. Build a research building on campus.	1/19/2016 1:34 PM
3	MSRC is only one center. Is not finished just yet and there is a very limited amount of space for each researcher. If you are a leader of the tribe or maybe a friend of the tribe leader you can get extra space. However, the facilities are great, and they are managing in an adequate way.	1/12/2016 3:50 PM
4	Severe space limitations, type of science compatibility is very restricted, far from main campus, dividing time between MSRB and main campus is impractical.	1/12/2016 7:52 AM
#	Comments for "Meeting places for students"	Date
1	none	1/25/2016 7:42 PM
2	Hallways, Resource Center for organized meetings	1/19/2016 1:34 PM
3	Nonexistent	1/12/2016 3:50 PM
4	A local coffee shop in Rio Piedras has better meeting space than Facundo Bueso Bldg. The faculty club was an excellent addition to the university facilities.	1/12/2016 7:52 AM
5	Just the lobby of a building is not enough.	1/12/2016 6:42 AM
#	Comments for "Facilities for professors and students with children"	Date
1	none	1/25/2016 7:42 PM
2	Non-existent as far as I know. Need a supervised area on campus.	1/19/2016 1:34 PM
3	Nonexistent	1/12/2016 3:50 PM
4	Need to think better what this population needs and provide alternatives. Child care is essential (during seminar, for example).	1/12/2016 6:42 AM
#	Comments for "Access to departmental research facilities-Nanoscopy facility"	Date
1	TEM facility service is unreliable.	1/25/2016 7:42 PM

2	We have a state of the art facility being managed by a bureaucrat. Access is limited to 1 or 2 professors from physics and maybe one more from chemistry... Other than that... Nothing. I have been trying to get work done using this facility since a year ago... and guess what? Yes, nothing! My resolution to this has been to pay a per fee to use instrument abroad.	1/12/2016 3:50 PM
3	It is impossible to obtain access to those instruments unless you are a member of a certain NASA grant. Students cannot obtain training on main TEM instruments, only on the old SEM. Technician in charge of facility is rude, and hard to reach.	1/12/2016 7:52 AM
#	Comments for "Access to departmental research facilities-NMR facility"	Date
1	As long as we pay our bills, it is functioning.	1/19/2016 1:34 PM
2	I do not use this facility.	1/12/2016 3:50 PM
3	I have never used it, but have seen many students using the NMR instruments. That seems to be a well managed facility.	1/12/2016 7:52 AM
#	Comments for "Access to departmental research facilities-MS facility"	Date
1	Keep it running.	1/19/2016 1:34 PM
2	Good to know that there is a MS facility.	1/12/2016 3:50 PM
3	Do we have a MS?	1/12/2016 7:52 AM
#	Comments for "Access to departmental research facilities-Surface science facility"	Date
1	We had a nice collaboration with Cabrera.	1/19/2016 1:34 PM
2	If these are the instruments at MSRC: there is only one working and its quite overload. I have heard of a lot of work being conducted by users that are not from the University of Puerto Rico.	1/12/2016 3:50 PM
3	I had never heard of such facility on campus. I believe people enjoy hiding the few good things that exist on campus.	1/12/2016 7:52 AM
#	Comments for "Access to departmental research facilities-X-ray crystallography facility"	Date
1	I have not used this recently, but we have in the past.	1/19/2016 1:34 PM
2	Do not use it.	1/12/2016 3:50 PM
#	Comments for "Access to departmental research facilities-Biotesting facility"	Date
1	Does not exist.	1/25/2016 7:42 PM
2	Good to know that we have access to this. Come on! This is the lab for a couple of people.	1/12/2016 3:50 PM
#	Comments for "Access and quality of office/working space for students"	Date
1	The design plans of FB did not take this into account. My space is fine, but others have problems.	1/19/2016 1:34 PM
2	Not bad at all.	1/12/2016 3:50 PM
3	Office space is limited.	12/14/2015 9:40 AM
#	Comments for "Access and quality of office/working space for faculty"	Date
1	Offices are too small. Difficult to fix.	1/19/2016 1:34 PM
2	Its okay.	1/12/2016 3:50 PM
3	Not all faculty have offices. Internet access is complicated depending on the part of the building you are located. Faculty have to set up the internet; school should send technician to connect local internet network, and provide the equipment.	1/12/2016 7:52 AM
4	Improve windows in all offices, doors, painting.	1/12/2016 6:42 AM
#	Comments for "Peer mentoring for newly recruited faculty"	Date
1	Exist to some degree, but should be formalized.	1/25/2016 7:42 PM
2	This is not formulized. Perhaps it should, but we have seen faculty develop regularly under the present system.	1/19/2016 1:34 PM
3	Bad	1/12/2016 3:50 PM
4	We talk, but everyone has to many of their own problems to deal with. Life is very difficult on this campus, I believe this school should focus more on education and scientific research rather than having students playing drums in the clock tower.	1/12/2016 7:52 AM

5	Need to do it in a more concrete, formal way.	1/12/2016 6:42 AM
6	At present there is no program in place.	12/14/2015 9:40 AM
#	Comments for "Administrative resources"	Date
1	Poor	1/25/2016 7:42 PM
2	We have gone backward.	1/19/2016 1:34 PM
3	If you mean by this having a functional department with someone actually taking care of the day to day errands the answer is: nonexistent	1/12/2016 3:50 PM
4	Some resources are significantly more helpful than others.	1/12/2016 9:58 AM
#	Comments for "Deanship's support for proposal submission"	Date
1	My grants were not handled through the Dean's office. The University and the Resource Center have offices to help.	1/19/2016 1:34 PM
2	It is very variable. But usually works.	1/12/2016 3:50 PM
#	Comments for "Deanship's support for laboratory maintenance"	Date
1	They really try, but planta fisica in unreliable.	1/25/2016 7:42 PM
2	More money	1/19/2016 1:34 PM
3	Good most of the time	1/12/2016 3:50 PM
4	It depends too much on campus-wide maintenance people who do not respond quickly to a science department needs.	1/12/2016 6:42 AM
#	Comments for "Entrepreneurship training and support"	Date
1	Not generalized in our departamental culture yet.	1/25/2016 7:42 PM
2	This is not a strength in PR. PRIDCO does provide help in this area.	1/19/2016 1:34 PM
3	None existent. Develop and offer an entrepreneurship training and support program.	1/13/2016 3:36 PM
4	Nothing.	1/12/2016 3:50 PM
5	Frequent workshops on this topic needed.	1/12/2016 6:42 AM
#	Comments for "Training and support on intellectual property protection, patents, licensing, start-ups"	Date
1	Central Administration tries to do the job, but it still needs to take off.	1/25/2016 7:42 PM
2	I did not find this to be user-friendly. Need better orientation and assistance to get into this activity.	1/19/2016 1:34 PM
3	Same as previous answer...	1/13/2016 3:36 PM
4	Nothing.	1/12/2016 3:50 PM
5	Workshops needed, IT office needs to take an active role, not a passive one.	1/12/2016 6:42 AM

Q13 Current position

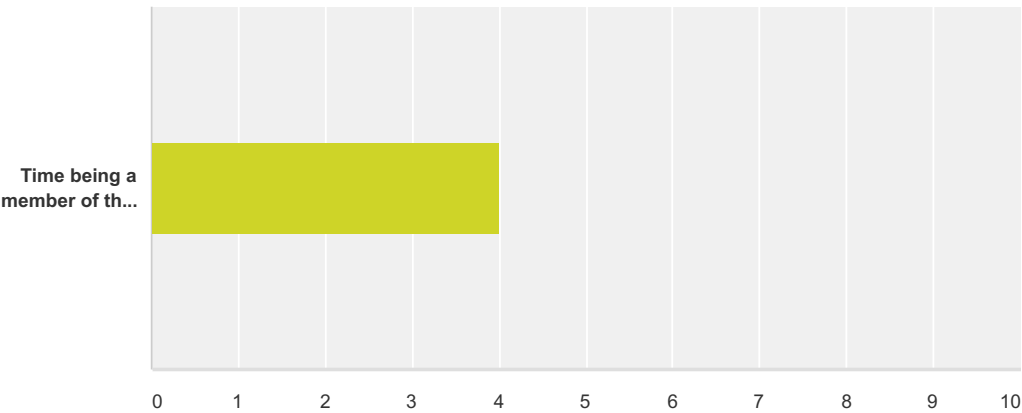
Answered: 12 Skipped: 2



	UPR-Rio Piedras Chemistry Graduate Program	Other UPR-Rio Piedras graduate program	Other UPR graduate program not in Rio Piedras campus	Non-UPR university in Puerto Rico	University not in Puerto Rico	Other	Total	Weighted Average
Which graduate program are you a member of?	91.67% 11	0.00% 0	0.00% 0	0.00% 0	0.00% 0	8.33% 1	12	1.42

Q14 Experience

Answered: 13 Skipped: 1

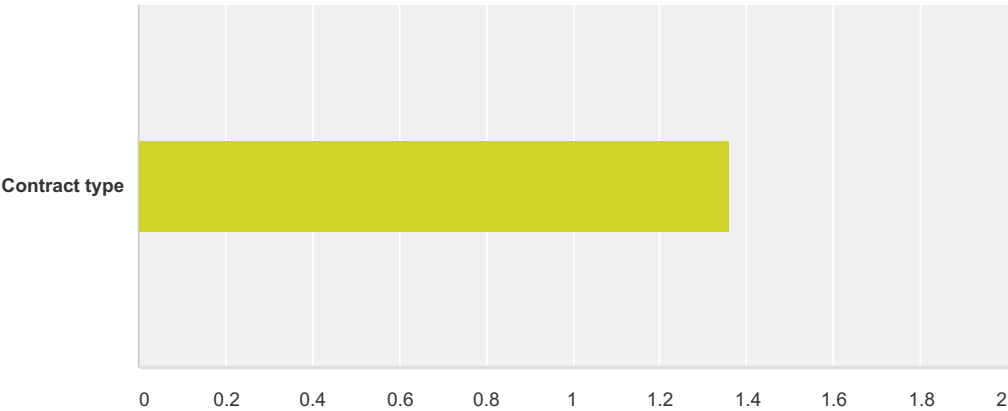


	0-5 years	6-10 years	11-15 years	16-20 years	20-25 years	25-30 years	31 and more years	N/A	Total	Weighted Average
Time being a member of the UPR-RP Chemistry Graduate Program	38.46% 5	0.00% 0	7.69% 1	0.00% 0	7.69% 1	23.08% 3	23.08% 3	0.00% 0	13	4.00

#	comments	Date
1	It has been an experience.	1/19/2016 1:36 PM

Q15 Contract

Answered: 13 Skipped: 1

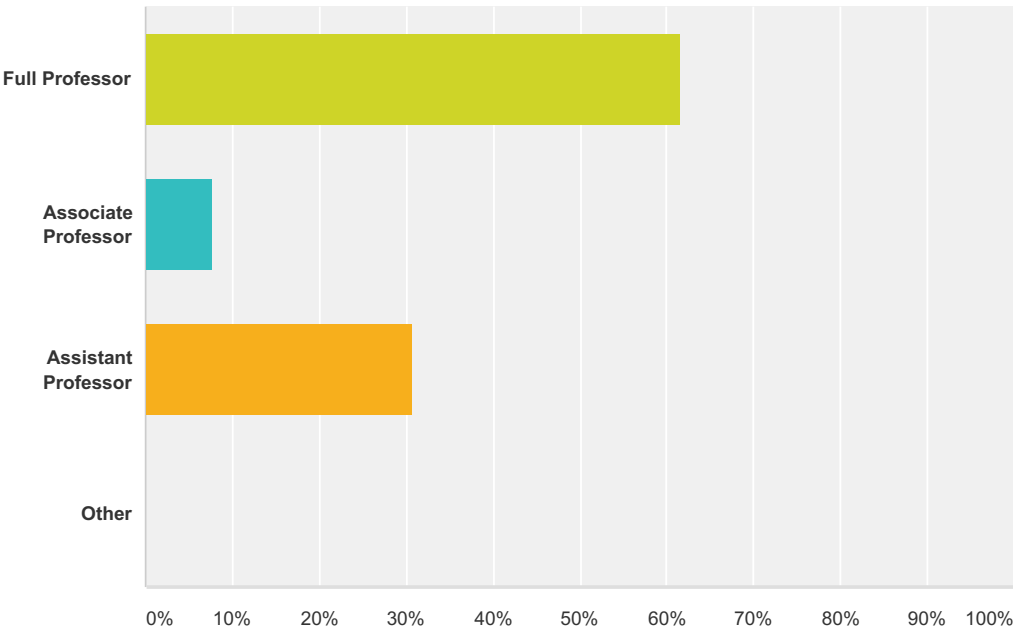


	Full Time Tenured	Full-time Tenure track	Full-time Contract	Part Time-contract	N/A	Total	Weighted Average
Contract type	53.85% 7	30.77% 4	0.00% 0	0.00% 0	15.38% 2	13	1.36

#	Comments for "Contract type"	Date
	There are no responses.	

Q16 Which of the following best describes your current academic rank?

Answered: 13 Skipped: 1

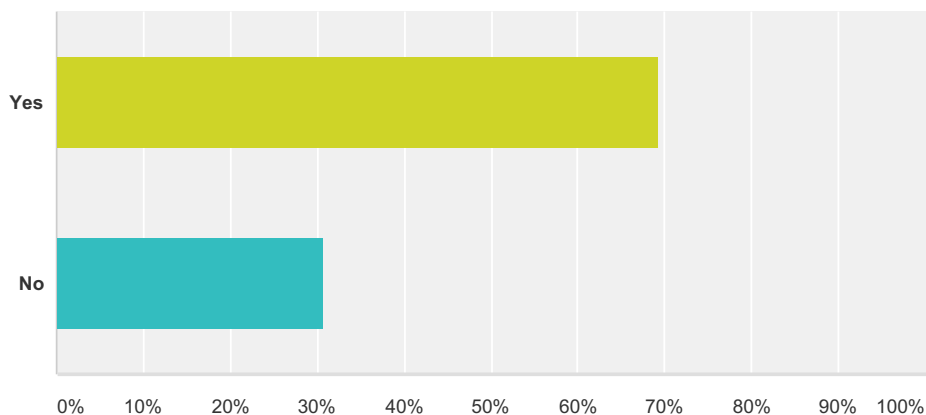


Answer Choices	Responses
Full Professor	61.54%8
Associate Professor	7.69%1
Assistant Professor	30.77%4
Other	0.00%0
Total	13

#	comments	Date
	There are no responses.	

Q17 Would you recommend to a friend to apply for a tenure-track position in the Chemistry Graduate Program?

Answered: 13 Skipped: 1

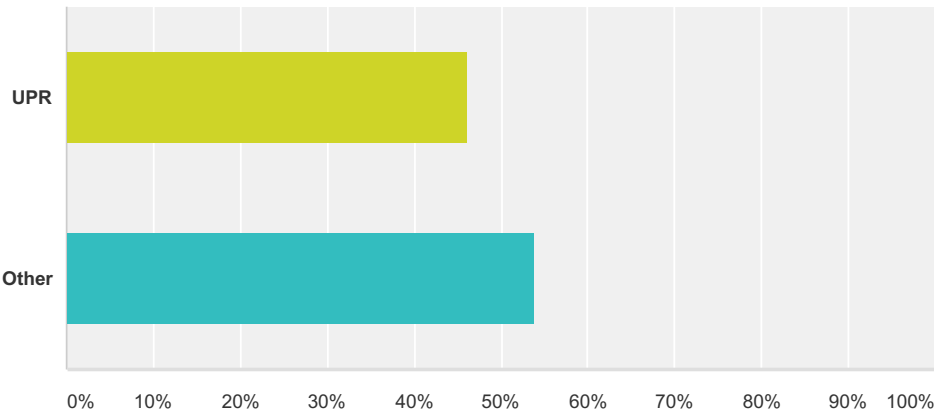


Answer Choices	Responses
Yes	69.23% 9
No	30.77% 4
Total	13

#	comments	Date
1	Now is not a good time with PR in such an economic crisis.	1/19/2016 1:36 PM
2	Even all the problems we face, Yes! Why? Because you can get the work done...	1/12/2016 3:52 PM
3	This once was a better university, financial resources exist though these have been misused and practically killed science in Puerto Rico. There are good, motivated students. This university must be rescued before it returns to the old status of a teaching only institution.	1/12/2016 7:56 AM

Q18 Where did you obtained your Ph.D.?

Answered: 13 Skipped: 1



Answer Choices		Responses	
UPR		46.15%	6
Other		53.85%	7
Total			13

#	comments	Date
1	University od Colorado, Boulder	1/19/2016 1:59 PM

Q19 Additional final comments about the evaluation of the program. Please also give recommendations for the five-year development plan (in terms of student and faculty recruitment, curriculum, facilities, management, etc.).

Answered: 3 Skipped: 11

#	Responses	Date
1	Take better care of the facilities. It is a tough time and one can not do much without money. Need to lobby government to sustain present levels before committing to too many new initiatives.	1/19/2016 1:59 PM
2	Forget the MSRB, invest in the main campus. We need a real science building, not temporary fixes.	1/12/2016 7:57 AM
3	It is a good program, but can become a great program. Student recruitment in Central and Latin America needs to be emphasized. A research building on campus is essential for the future development of the program.	1/12/2016 6:46 AM

Q20 If you wish to be considered to participate in a focus group on these subjects, please complete the following:

Answered: 1 Skipped: 13

Answer Choices	Responses
Name	100.00% 1
Company	100.00% 1
Address	100.00% 1
Address 2	0.00% 0
City/Town	100.00% 1
State/Province	100.00% 1
ZIP/Postal Code	100.00% 1
Country	100.00% 1
Email Address	100.00% 1
Phone Number	100.00% 1

#	Name	Date
1	John A. Soderquist	1/19/2016 1:59 PM
#	Company	Date
1	UPR-RP	1/19/2016 1:59 PM
#	Address	Date
1	PO Box 23346	1/19/2016 1:59 PM
#	Address 2	Date
	There are no responses.	
#	City/Town	Date
1	San Juan	1/19/2016 1:59 PM
#	State/Province	Date
1	PR	1/19/2016 1:59 PM
#	ZIP/Postal Code	Date
1	00931	1/19/2016 1:59 PM
#	Country	Date
1	USA	1/19/2016 1:59 PM
#	Email Address	Date
1	jasoderquist@yahoo.com	1/19/2016 1:59 PM
#	Phone Number	Date
1	7873091268	1/19/2016 1:59 PM

Q21 The program will be evaluated by two external faculty reviewers and an alumni. If you have a recommendation of who this people should be, please give us their names and contact information.

Answered: 3 Skipped: 11

#	Responses	Date
1	Professor George W. Kabalka Department of Chemistry University of Tennessee, Knoxville TN 37996 Phone (615)974-3260 e-mail: kabalka@utk.edu Professor Bakthan Singaram Department of Chemistry and Biochemistry 1156 High St., University of California, Santa Cruz Santa Cruz, CA 95064 Phone (408)459-3154; SINGARAM@CHEMISTRY.UCSC.EDU Dr. Karl Matos Manager Research, Development & Quality Systems BASF Corporation 1424 Mars Evans City Road Evans City, PA 16033 PH: 724.538.1309 karl.matos@basf.com	1/19/2016 1:59 PM
2	I ran out of steam half way. Please don't make this surveys so long!	1/19/2016 10:01 AM
3	Dr. Oscar Dubon, University of Berkeley oddubon@berkeley.edu	1/12/2016 3:54 PM

Appendix 5

Informe Anual Departamento de Química Año Académico 2010-2011

1. Investigación

1.1 Proyectos de investigación

Una descripción detallada de los proyectos de investigación que actualmente se llevan a cabo en el Departamento de Química se puede encontrar en la siguiente página en el web <http://chemistry.uprrp.edu>. Se incluyen proyectos de investigación interdisciplinarios que cubren todas las áreas de la Química.

1.2 Publicaciones

Más de 70 publicaciones a nivel internacional se reportaron en el Departamento de Química durante el periodo de agosto 2010 a julio 2011. Se destaca una alta cantidad de artículos tanto en el área computacional como en electroquímica. Para ver una lista parcial de las publicaciones reportadas por los profesores durante este periodo ver la lista que se detalla a continuación.

A comparative photophysical and photochemical study of nitropyrene isomers occurring in the environment. **Arce, R.**, Pino, E.F., Valle, C., Negrón-Encarnación, I., Morel, M. *J. Phys-Chem. A.* 2011, 115, 152-160.

Quenching enhancement of the singlet excited state of pheophorbide-a by DNA in the presence of the quinine carboquone. Alegría, A., Díaz-Espinosa, Y., Crespo-Hernández, C., García, G., **Arce, R.** *Photochem. Photobiol.* 1022, 87, 275-283.

Nanosecond laser induced transient absorption flash photolysis experiment for undergraduate physical chemistry. Oyola, R. **Arce, R.** *Chem. Educator* 2010, 15, 365-369.

Lillian Bird, "Logical Reasoning Ability and Student Performance in General Chemistry", *J.Chem.Educ.* 2010, 87(5), pp 541-546.

Open-Shell Singlet Character of Stable Derivatives of Nonacene, Hexacene and Teranthene Xingfa Gao, Jennifer L. Hodgson, De-en Jiang, Shengbai B. Zhang, Shigeru Nagase, Glen P. Miller, **Zhongfang Chen**, *Org. Lett.* 2011, 13, 3316-3319.

Versatile Electronic and Magnetic Properties of Corrugated V₂O₅ Two-Dimensional Crystal and Its Derived One-Dimensional Nanoribbons: A Computational Exploration, Qing Tang, Fengyu Li, Zhen Zhou,* **Zhongfang Chen**, *J. Phys. Chem. C.* 2011, 115, 11983-11990.

Interactions between Al₁₂X (X = Al, C, N and P) Nanoparticles and DNA Nucleobases/base Pairs: Implication to Nanotoxicity Peng Jin,* Yongsheng Chen, Shengbai B. Zhang, **Zhongfang Chen**, *J. Mol. Mod.* 2011, DOI 10.1007/s00894-011-1085-5.

Theoretical Design of Novel Trinuclear Sandwich Complexes with Central M₃ Triangles (M = Ni, Pd, Pt) Peng Jin,* Fengyu Li, **Zhongfang Chen**, *J. Phys. Chem. A*, 2011, 115, 2402-2408.

SiC₂ Silagraphene and Its One-Dimensional Derivatives: Where Planar Tetracoordinate Silicon Happens Yafei Li, Fengyu Li, Zhen Zhou, **Zhongfang Chen**, *J. Am. Chem. Soc.* 2011, 133, 900-

How Do Surface and Edge Effects Alter the Electronic Properties of GaN Nanoribbons? Qing Tang, Yao Cui, Yafei Li, Zhen Zhou,* **Zhongfang Chen**, *J. Phys. Chem. C* **2011**, 115, 1724–1731.

Surface Engineering of Graphene-Enzyme Nano Composites for Miniaturized Biofuel Cell, Chang Liu, **Zhongfang Chen**, Chen-Zhong Li, *IEEE Transactions on Nanotechnology* **2011**, 10, 59-62.

Boron Fullerenes with 32-56 Atoms: Irregular Cage Configurations and Electronic Properties Lu Wang, Jijun Zhao, Fengyu Li, **Zhongfang Chen**, *Chem. Phys. Lett.* **2010**, 501, 16-19.

Stability of Graphene Oxide Phases from First-principles Calculations, Lu Wang, Yiyang Sun, Kyuho Lee, Damian West, **Zhongfang Chen**, Jijun Zhao, Shengbai Zhang, *Phys. Rev. B (Rapid Communication)* **2010**, 82, 161406R.

Tuning Electronic and Magnetic Properties of Wurtzite ZnO Nanosheets by Surface Hydrogenation Qing Tang, Yafei Li, Zhen Zhou,* Yongsheng Chen, **Zhongfang Chen**, *ACS Applied Materials & Interfaces* **2010**, 2, 2442–2447.

Accuracy of Density Functional Theory Methods for Weakly Bonded Systems: The Case of Dihydrogen Binding on Metal Centers, Yiyang Sun, Kyuho Lee, Lu Wang, Yong-Hyun Kim, Wei Chen, **Zhongfang Chen**, S. B. Zhang, *Phys. Rev. B* **2010**, 82, 073401.

B₈₀ and Other Medium-sized Boron Clusters: Core-shell Structures, Not Hollow Cage, Jijun Zhao,* Lu Wang, Fengyu Li, **Zhongfang Chen**, *J. Phys. Chem. A* **2010**, 114, 9969–9972.

Feliciano-Ramos, I.; Caban-Acevedo, M.; Scibioh, M. A.; **Cabrera, C. R.**, Self-assembled monolayers of L-cysteine on palladium electrodes. *Journal of Electroanalytical Chemistry* **2010**, 650, (1), 98-104.

Rosario-Castro, B. I.; Contes-de-Jesus, E. J.; Lebron-Colon, M.; Meador, M. A.; Scibioh, M. A.; **Cabrera, C. R.**, Single-wall carbon nanotube chemical attachment at platinum electrodes. *Applied Surface Science* **2010**, 257, (2), 340-353.

Rao, C. V.; **Cabrera, C. R.**; Ishikawa, Y., In Search of the Active Site in Nitrogen-Doped Carbon Nanotube Electrodes for the Oxygen Reduction Reaction. *Journal of Physical Chemistry Letters* **2010**, 1, (18), 2622-2627.

Daza, C. E.; **Cabrera, C. R.**; Moreno, S.; Molina, R., Syngas production from CO(2) reforming of methane using Ce-doped Ni-catalysts obtained from hydrotalcites by reconstruction method. *Applied Catalysis a-General* **2010**, 378, (2), 125-133.

Santiago-Rodriguez, L.; Sanchez-Pomales, G.; **Cabrera, C. R.**, Single-Walled Carbon Nanotubes Modified Gold Electrodes as an Impedimetric DNA Sensor. *Electroanalysis* **2010**, 22, (4), 399-405.

La-Torre-Riveros, L.; Soto, K.; Scibioh, M. A.; **Cabrera, C. R.**, Electrophoretically Fabricated Diamond Nanoparticle-Based Electrodes. *Journal of the Electrochemical Society* **2010**, 157, (6), B831-B836.

Santiago, D.; Rodriguez-Calero, G. G.; Rivera, H.; Tryk, D. A.; Scibioh, M. A.; **Cabrera, C. R.**, Platinum Electrodeposition at High Surface Area Carbon Vulcan-XC-72R Material Using a Rotating Disk-Slurry Electrode Technique. *Journal of the Electrochemical Society* **2010**, 157, (12), F189-F195.

Jimenez, J. A.; Lysenko, S.; Liu, H.; Fachini, E.; **Cabrera, C. R.**, Investigation of the influence of silver and tin on the luminescence of trivalent europium ions in glass. *Journal of Luminescence* **2010**, 130, (1), 163-167.

Santana, J. A.; **Cabrera, C. R.**; Ishikawa, Y., A density-functional theory study of electrochemical adsorption of sulfuric acid anions on Pt(111). *Physical Chemistry Chemical Physics* **2010**, 12, (32), 9526-9534.

Santiago-Rodriguez, L.; Sanchez-Pomales, G.; **Cabrera, C. R.**, DNA-Functionalized Carbon Nanotubes: Synthesis, Self-Assembly, and Applications. *Israel Journal of Chemistry* **2010**, 50, (3), 277-290.

Santiago-Rodriguez, L.; Sanchez-Pomales, G.; **Cabrera, C. R.**, Electrochemical DNA Sensing at Single-walled Carbon Nanotubes Chemically Assembled on Gold Surfaces. *Electroanalysis* **2010**, 22, (23), 2817-2824.

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1.3 Obra Creativa

La obra creativa en el Departamento de Química también se manifestó a nivel de manuales para laboratorios de investigación como en la solicitud de patentes. Algunos ejemplos se señalan a continuación.

I. Montes and **P. González** Experiencias para el Laboratorio de Química Orgánica, Pearson Custom Publishing, Third edition, 2010.

C. Cabrera - Provisional Patent Application 61/529,633, "Externally interfaced urea electrochemical bioreactor at forward osmosis/reverse osmosis subsystem for energy and waste recovery in water recycling".

1.4 Ponencias y conferencias locales

Se destacan durante este periodo más de 25 ponencias y conferencias locales. Los profesores del Departamento han dictado charlas en otras instituciones de educación superior dentro de Puerto Rico. Continúa siendo la participación local preferida de los estudiantes graduados y subgraduados los Junior y Senior Technical meetings auspiciados por la sociedad del ACS local. Para una lista parcial de esta participación ver la lista que se incluye.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : from Li ion anodes to (bio) fuel cell catalysts", University of Puerto Rico at Humacao, September 2011.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : from Li ion anodes to (bio) fuel cell catalysts", University of Turabo, Caguas, PR, October 2011.

Carballeira, N. M. "Natural Marine and Terrestrial Fatty Acids as a New Source of Novel Antileishmanial Agents", Department of Chemistry, University of Puerto Rico at Cayey, Cayey, Puerto Rico, April 26, 2011.

Rosado, K., Orellano, E. A., and Carballeira, N. M. "Role of Fatty Acids in Retinoic Acid Differentiated Human SH-SY5Y Neuroblastoma Cells", 46th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 31st Puerto Rico Interdisciplinary Scientific Meeting, Interamerican University of Puerto Rico, Bayamón Campus, Bayamón, Puerto Rico, March 12, 2011.

Giménez, L., Orellano, E. A., and Carballeira, N. M. "Synthesis of New Long-Chain Unsaturated Fatty Acids as Potential HIV-1 RT Inhibitors", 46th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 31st Puerto Rico Interdisciplinary Scientific Meeting, Interamerican University of Puerto Rico, Bayamón Campus, Bayamón, Puerto Rico, March 12, 2011.

Cintrón, G. A., Carballeira, N. M., Montano, N., Márquez, C., Fernández-Prada, C., Fernández-Rubio, C., and Balaña-Fouce, R. "First Total Synthesis and Antiprotozoal Activity of the (Z)-16-Methyl-11-heptadecenoic Acid, a Recently Discovered Novel Fatty Acid from the Sponge *Dragmaxia undata*", 46th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 31st Puerto Rico Interdisciplinary Scientific Meeting, Interamerican University of Puerto Rico, Bayamón Campus, Bayamón, Puerto Rico, March 12, 2011.

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Montano, N., Cintrón, G. A., Márquez, C., Fernández-Prada, C., Fernández-Rubio, C., Balaña-Fouce, R., and Carballeira, N. M. "First Total Synthesis and Antiprotozoal Activity of the 16-Methyl-11Z-heptadecenoic Acid, a Recently Discovered Novel Fatty Acid from the Sponge *Dragmaxia undata*", 34th ACS Senior Technical Meeting, Mayagüez Resort and Casino, Mayagüez, Puerto Rico, November 5, 2010.

Electrochemical and Chemical Characterization of Titanocene Dichloride Intercalated in Zirconium Phosphate Layers for Use in Biotechnology", Barbara Casañas Montes, Cindy Barbosa, Jorge L. Colón, 34th Senior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Mayagüez, PR. November 2010.

Intercalation of Ti and Mo Based-Metallocene Derivatives in Zirconium Phosphate for Potential Use as Drug Carriers", Casañas, Bárbara; Barbosa, Cindy; Ramos, Coralís; Collazo, Cindy; Cintrón, Isatis; Colón, Jorge L., 31th Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and 46th Junior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Bayamón, Puerto Rico, March 2011.

Ferrocene Derivatives Intercalated in Zirconium Phosphate Layers, Cintrón, Isatis; Casañas, Bárbara; Morales, Mara; Santiago, Mitk'El; Miller, Andriamery; Montes, Ingrid; Colón, Jorge L., 31th Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and 46th Junior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Bayamón, Puerto Rico, March 2011.

Intercalation of Molydocene Dichloride into Zirconium Phosphate Layers as a Possible Drug Delivery System, Collazo, Cindy; Casañas, Bárbara; Ramos, Coralís; Cintrón, Isatis; Barbosa, Cindy; Meléndez, Enrique; Colón, Jorge L., 31th Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and 46th Junior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Bayamón, Puerto Rico, March 2011.

Titanocene Dichloride Intercalated in Zirconium Phosphate Layers as a Potential Anticancer Drug Delivery System, Ramos, Coralís; Barbosa, Cindy; Casañas, Bárbara; Colón, Jorge L., 31th Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and 46th Junior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Bayamón, Puerto Rico, March 2011.

(Colón, Jorge L.- Invited) "Artificial Photosynthesis", Colegio de Químicos de Puerto Rico, Convención Anual PRCHEM 2010, San Juan, Puerto Rico, August 2010.

(Colón, Jorge L.- Invited) "Bioinorganic Chemistry", Colegio de Químicos de Puerto Rico, Convención Anual PRCHEM 2010, San Juan, Puerto Rico, August 2010.

(Colón, Jorge L.- Invited) "Tranporte de Drogas Anticáncer Mediante Nanopartículas", Colegio de Químicos de Puerto Rico, Convención Anual PRCHEM 2010, San Juan, Puerto Rico, August 2010.

Drug Delivery Using Layered Inorganic Nanomaterials", **Jorge L. Colón**, Agustín Díaz, Amanda David, Riviam Pérez, Millie L. González, Adriana Báez, Stacey E. Wark, Tiffany B. Kinnibrough, Paul Zhang, and Abraham Clearfield, 34th Senior Technical Meeting of the Puerto Rico Section of the American Chemical Society, Mayagüez, P.R., November 2010.

Transporte de Drogas Anticáncer Mediante Nanopartículas, **J. L. Colón**. Simposio Química: Ciencia de todos y para todo sponsored by UPR-Carolina, San Juan, May 2011.

Soma Das, Raphael G. Raptis, "Gaining water-solubility in an octanuclear Fe-pyrazolate cluster by changing the bridging ligand", PRISM 2011, Universidad Interamericana Bayamon, Puerto Rico, March 12, 2011.

Logesh Mathivathanan, Omar Garcia, Jorge Torres King, Marlyn Rivera-Carrillo, Arturo J. Hernandez Maldonado and Raphael G. Raptis, "Cu(II)-pyrazolate cluster based metal organic frameworks", 31st Puerto Rico Interdisciplinary Scientific Meeting, Bayamon, PR, March 12, 2011.

Kennett I. Rivero and Raphael G. Raptis, "Iron-Oxo Pyrazolato Clusters Containing a Redox-Active Fe₄O₄ Cubane Core", 31st Puerto Rico Interdisciplinary Scientific Meeting/ 46th ACS Junior Technical Meeting, Bayamón, Puerto Rico, March 12, 2011.

Delgado, Roxanna and C. M. Torres-Díaz 46th ACS Junior Technical Meeting and 31st Puerto Rico Interdisciplinary Scientific Meeting (PRISM), Inter American University-Bayamon, March 12, 2011, , UPR-RIO PIEDRAS, Studying π - π Interactions in Dimers of 1,2-dihydro-1,2-azaborine.

A.R. Mayol, *Developing Effective Mentoring Skills for the Academia*, Graduate Student Skills Development Workshop offered by the Dean of Graduate Students, University of Puerto Rico-Rio Piedras Campus July, 2011 (invited guest speaker)

1.5 Investigación de Estudiantes

Los estudiantes subgraduados se destacaron por su participación en proyectos de investigación auspiciados por los programas AMP, MARC y RISE. Hubo una alta participación estudiantil subgraduada en estos programas.

2. Programas Académicos

2.1 Evaluación y revisión de los programas académicos

El programa que recibió mayor evaluación durante este periodo fue el programa doctoral graduado. En dicho programa se invirtió el orden de la presentación de la propuesta A y el seminario graduado con miras a acelerar el tiempo de graduación de los estudiantes graduados.

2.2 Cambios en los programas

Debido a la evaluación anterior ahora los estudiantes graduados deben presentar su propuesta A antes de presentar su seminario graduado. Este cambio se realizó y está siendo evaluado para su efectividad. Este ha sido el cambio curricular más significativo durante este periodo.

2.3 Revisión curricular de los programas

El programa subgraduado de química continua bajo el nuevo bachillerato.

2.4 Avalúo del aprendizaje

Durante el año académico 2010-2011, el Programa Subgraduado de Química, con el visto bueno de la Oficina de Evaluación del Aprendizaje Estudiantil (OEAE) en la UPR-RP, decidió realizar avalúo del aprendizaje estudiantil en los primeros cinco dominios del Recinto, que incluyen: (1) Capacidad crítica, (2) Comunicación efectiva, (3) Investigación y creación, (4) Capacidad para el estudio independiente, y (5) Responsabilidad social. En adición, se realizó avalúo en los dos dominios del Programa de Química, que incluyen: (1) Contenido de la disciplina, y (2) Destrezas de laboratorio.

Para cada dominio en donde se realizó avalúo, se redactaron unos objetivos de aprendizaje estudiantil y se diseñaron unas actividades o instrumentos para medir el logro alcanzado en cada objetivo. El avalúo del aprendizaje se midió en tres instancias de la trayectoria académica de los estudiantes del Programa de Química. La primera instancia corresponde al curso de Química General (Q3001-2), la segunda instancia corresponde al curso de Química Orgánica (Q3451-2) o Química Analítica (Q3255), y la tercera instancia corresponde al curso de laboratorio de Análisis Instrumental (Q4015L) o de Química Física (Q4041-4). El Profesor del curso participante del avalúo envió la data de avalúo mediante correo electrónico, y ésta se analizó usando Microsoft Excel. Al comparar el hallazgo de avalúo en cada curso participante, con el indicador de logro propuesto para cada objetivo de aprendizaje estudiantil, se pudo evaluar si los estudiantes del curso cumplieron con las expectativas propuestas en el indicador de logro. Los Profesores tomaron diversas acciones transformadoras necesarias para mejorar el aprendizaje en sus cursos. Para más detalles, favor de consultar el Informe Anual de "Assessment" del Aprendizaje Estudiantil 2010-2011 del Programa Subgraduado de Química. Los dominios de Destrezas de Información y Curiosidad Intelectual se incorporarán en el avalúo del aprendizaje estudiantil para el año 2011-2012.

2.5 Cambios e innovaciones en los programas

A. Cambios en los laboratorios de Química Analítica como parte de la revisión curricular del curso QUIM 3255 bajo la propuesta de MSEIP (2009-2011)

Se usaron fondos del Minority Science and Engineering Improvement Program (MSEIP) para la adquisición e implantación de una red de adquisición de datos (*Measurenet*) para los dos laboratorios de Química Analítica (CN-304 y CN-306). Con dicho sistema se adquirió la siguiente instrumentación:

- Cromatógrafo Líquido de Alta Eficiencia (HPLC)
- Cromatógrafo de Gas con detección termal (GC-TD)
- Colorímetro
- Espectrofotómetro (UV-Vis)
- Electrodo de pH y Electrodo Selectivo a fluoruro
- Detector óptico para conteo de gotas en titulaciones automáticas

Esta infraestructura apoyó una iniciativa para revisar la oferta curricular del laboratorio incluyendo la introducción de 12 proyectos especiales que los estudiantes realizan de manera independiente durante el último mes del curso. El propósito del proyecto es lograr que los estudiantes entiendan y apliquen el proceso analítico para la determinación cuantitativa de sustancias en muestras reales.

B. Curso Química Medicinal (QUIM 5995)

Durante el segundo semestre de 2010-11 la Dra. Rosa Betancourt-Pérez enseñó por primera vez en el Departamento de Química un curso de Química Medicinal. El curso requirió un año de Química Orgánica y un año de Química General y la mayoría de los estudiantes que lo tomaron eran sub-graduados. Los estudiantes estudiaron los principios multidisciplinarios que forman parte del diseño moderno de drogas. Pudieron aplicar los principios químicos que son fundamentales en la "Química Medicinal", tal como la relación entre estructura molecular y actividad biológica. Desarrollaron conocimiento sobre los procesos involucrados en la acción los de fármacos. El curso se enseñó mediante conferencias, trabajos en clase, asignaciones y presentaciones por estudiantes. Cada estudiante realizó una investigación sobre un

medicamento y lo presentó de forma oral y escrita. La investigación incluyó las siguientes áreas: Estructura química y propiedades físicas; Descubrimiento/ Aislación/ Síntesis; Compañía que lo fabrica; Clasificación o categoría terapéutica; modo de administración; distribución; metabolismo; mecanismo de acción; efectos secundarios/ toxicidad; eliminación.

2.6 Acreditación

El programa de bachillerato de Química continúa acreditado por la American Chemical Society (ACS).

2.7 Recursos para la docencia

Los laboratorios de Química fueron renovados y durante este año académico se terminaron de acondicionar para mejorar los ofrecimientos en Química General, Química Orgánica, Química Analítica, Química Física y Química Instrumental. Se comparte el laboratorio de Química Instrumental con el programa de Ciencias Ambientales en donde se adquirió nueva instrumentación para dicho laboratorio, en particular un ICP-MS.

3. Facultad

3.1 Perfil y reclutamiento

Durante este periodo no se reclutó ningún personal docente para el Departamento de Química. Se perdieron tres profesores en las áreas de Bioquímica (2) y Química Computacional (1) añadido al hecho de que se retiró un docente en el área de Educación en Química. Nuevos esfuerzos se deben hacer para reemplazar este personal. Las áreas que necesitan reclutamiento son Bioquímica y Química Analítica.

3.2 Mejoramiento profesional

Los profesores del Departamento de Química asistieron a varios talleres de mejoramiento profesional. Un área favorecida fue la de presentación y evaluación de propuestas externas para así fortalecer la capacidad de la facultad en la obtención de fondos externos. Algunas de estas actividades se detallan a continuación.

Dr. Arce Rafael –

Grant writers' Seminar and Workshop, write winning grants, sponsored by RISE, June 2011.

Dr. Jorge Colón -

Puerto Rico-Louis Stokes Alliance for Minority Participation 2011 6th Transdisciplinary Congress, May 2011, San Juan, Puerto Rico.

Dra. Ingrid Montes-

Biennial Conference in Chemical Education-August 2010, Texas
Gordon Research Conference on Chemistry Education Research & Practice-Davidson College, Davidson, North Carolina, United States
Fall ACS Meeting- Boston, MA

Spring ACS Meeting-Anaheim, CA

Dr. Carlos Torres –

1. SC10 Supercomputing Meeting 2010, Education Program, New Orleans, LA, November 13-16, 2010. Advanced Topics in SageMath (12 hours), Computational Thinking (3 hours), Computational Chemistry (6 hours).
2. Crystallography for Chemists Workshop 2011, Center for Molecular Structure, California State Polytechnic University, Pomona, CA. June 19-24, 2011.
3. Telluride School on Theoretical Chemistry (TSTC), Telluride Science and Research Center, Telluride, Colorado. July 10-15, 2011.

Varios profesores –

Meeting of MBRS-Support of Competitive Research (SCORE) Program SC1 and SC2 Principal Investigators: Successes, Challenges and Opportunities in the Research Environment", December 2-3, 2010, National Institutes of Health (NIH), Bethesda, MD.

3.3 Reconocimientos

La Facultad del Departamento de Química recibió varios reconocimientos durante este periodo. Se destaca el reconocimiento internacional de la Dra. Montes como Fellow del ACS y el 2012 ACS Volunteer Service Award.

Dr. Carlos Cabrera-

1. Igaravidez Research Award, Puerto Rico Section, American Chemical Society, 2010
2. External Advisory Board Member: NSF-PREM, University of Texas at San Antonio (February 2011- Present)

Dra. Ingrid Montes-

1. Fellow ACS (American Chemical Society)
2. 2012 American Chemical Society Volunteer Service Award
3. Carl Storm Underrepresented Minority Fellowship program to support the participation at Gordon Research Conference.

Dr. Zhongfang Chen -

"Haitian Scholar" and "Visiting Professor", Dalian University of Technology, Dalian, China.

Dra. Liz Díaz –

Selected as the representative team for the Department Homeland Security DHS) Summer Research Team Program for Minority Institution. See link: <http://orise.orau.gov/science-education/research-experiences/faculty/11-liz-diaz-vazquez.aspx>

4. Estudiantes

4.1 Perfil y reclutamiento de estudiantes

Programa subgraduado

En este año académico un total de 87 estudiantes fueron admitidos al programa subgraduado de Química. Se mantuvo un cupo máximo de 100 estudiantes.

Programa graduado

Un total de 35 estudiantes solicitaron al programa graduado durante el año académico 2010-2011. De este número de estudiantes un total de 9 solicitudes fueron denegadas y un total de 10 estudiantes finalmente se matricularon para un 29%. De los estudiantes aceptados 3 venían de UPR-Cayey, 5 de UPR-Rio Piedras, 1 de UPR-Humacao y 1 de UPR-Arecibo.

4.2 Servicios y actividades estudiantiles

4.3 Logros estudiantiles

En el año académico 2010-11, 53 estudiantes obtuvieron el Bachillerato en Ciencias con concentración en Química. De estos 35 (66%) fueron mujeres y 18 (34%) hombres. El promedio de años para obtener el grado fue de 5.5. De los 53 graduados, 20 (38%) obtuvieron la certificación del ACS. El número de estudiantes que se graduó con los requisitos para solicitar la licencia de Químico fue 47 (87%). El número de estudiantes que investigó fue 46 (87%). El promedio de graduación fue 3.36 y el de concentración 3.13. El número de estudiantes que se graduó con honores fue 31 (59%). En la graduación de junio de 2011 José J. Fonseca Vega obtuvo el premio de la Facultad de Ciencias Naturales y Karla Ramos Torres obtuvo el Premio investigación y creatividad de la Facultad de Ciencias Naturales.

Algunas becas obtenidas por los estudiantes fueron las siguientes:

1. Dr. Agustín Díaz, former Ph.D. student and Postdoctoral Research Associate at Texas A&M University, 2011 Ford Foundation Postdoctoral Diversity Fellowship,

2. Barbara Casañas, Ph.D. student, 2010-2011 Fellowship of the GK-12 Program From Hectares to Nanometers: GK-12 Multidisciplinary Explorations of Tropical Ecosystems and Functional Nanoscience sponsored by the University of Puerto Rico System: the Institute of Tropical Ecosystem Studies (ITES) and the *Institute for Functional Nanomaterials*.

3. Fengyu Li, Programa de Becas por Mérito Académico y Ejecutorias Excepcionales para Estudiantes Graduados, University of Puerto Rico, 2011.

4.4 Tesis doctorales completadas y aprobadas

1. Bárbara Casañas	MS	Agosto 2006	Inorgánica
2. María del C. Rivera	MS	Agosto 2005	Bioquímica
3. Daniel Caballero	Ph.D.	Agosto 2003	Bioquímica
4. Liz M. Tirado	Ph.D.	Agosto 1995	Análítica

5. Gerardo Torres	Ph.D.	Agosto 1999	Orgánica
6. Janet Figueroa	MS	Agosto 1998	Orgánica
7. María Morel	Ph.D.	Agosto 2002	Analítica
8. Nashbly Montano	MS	Agosto 2003	Orgánica
9. Michelle Cartagena	Ph.D.	Agosto 2004	Orgánica
10. Brunilda Vera	Ph.D.	Agosto 1998	Orgánica
11. Madeline Díaz Serrano	Ph.D.	Agosto 2003	Analítica
12. José Betancourt	Ph.D.	Agosto 2001	Orgánica

4.5 Revalida y certificaciones

Los estudiantes de Química del Recinto de Río Piedras continúan obteniendo el mejor por ciento de aprobación de los exámenes de reválida ofrecidos por la Junta Examinadora de Químicos de Puerto Rico. El por ciento de aprobación ronda el 44%. En la reválida ofrecida en el mes de noviembre 9 estudiantes tomaron el examen y 5 lo aprobaron, mientras que en el mes de mayo 9 estudiantes tomaron el examen y 4 lo aprobaron.

5. Internacionalización del Recinto

5.1 Proyectos y alianzas de carácter internacional

Se destacan en el Departamento las colaboraciones a nivel internacional. El 70% de la facultad reporta colaboraciones con centros de investigación y universidades en Estados Unidos, mientras un porcentaje significativo de colaboraciones toma lugar con universidades europeas (17%) y con universidades orientales como en China (13%). Podemos decir que la internacionalización del Departamento es bastante alta. Algunos ejemplos de colaboraciones internacionales se presentan a continuación.

Dr. Rafael Arce-

1. Dr. Carlos Crespo Hernández – Case Western University, Ohio

Dr. Carlos Cabrera –

1. Dr. Héctor D. Abruña, Cornell University, USA.
2. Dr. Luis Echegoyen, University of Texas at El Paso, USA
3. Drs. Michael Flynn, Jing Li, and Meyya Meyyappan, NASA Ames Research Center, USA
4. Dr. Miguel José-Yacamán, Department of Physics and Astronomy, University of Texas at San Antonio, Texas, USA.
5. Drs. Michelle Manzo, Michael Meador and Félix Miranda, NASA Glenn Research Center, USA
6. Dr. Bryan Coughlin and James Watkins, University of Massachusetts at Amherst, USA.

Dr. Jorge Colón -

1. Abraham Clearfield, Texas A&M University, College Station, Texas: "Drug Delivery using Layered Inorganic Nanomaterials".

2. Bill Connick, University of Cincinnati, Cincinnati, Ohio: "Vapochromic Materials Based on Zirconium Phosphates".

Dr. Raphael Raptis -

1. Dr. John E. McGrady (U. of Oxford, U.K.)
2. Dr. Yiannis Sanakis (NCSR "Demokritos", Greece)
3. Dr. Ross McDonald (Los Alamos National Laboratories, Los Alamos, NM)
4. Dr. Jurek Krzystek (National High Magnetic Field Laboratory, Tallahassee, FL)

Dr. Néstor Carballeira -

1. Dr. Rafael Balaña- Fouce (University of León, Spain)
2. Dr. Deniz Tasdemir (Faculty of Pharmacy, University of London, UK)
3. Dr. Keykavous Parang (College of Pharmacy- University of Rhode Island, USA)
4. Dr. Richard D. Gandour (Chemistry Department, Virginia Tech, USA)

Dr. Zhongfang Chen –

1. Zhen Zhou (Nankai University, China),
2. Jijun Zhao (Dalian University of Technology, China),
3. Shengbai Zhang (Rensselaer Polytechnic Institute, USA),
4. Chunru Wang (Chinese Academy of Science, China),
5. Yongsheng Chen (Georgia Tech, USA),
6. Glen P. Miller (University of New Hampshire),
7. De-en Jiang (Oak Ridge National Lab)

Dra. Liz Diaz –

Dr. Oxley, University of Rhode Island at Kingston: *Development of MIP for the detection of explosive at trace levels.*

Dr. José Rivera –

Vincent M. Rotello, Ph.D. Charles A. Goessmann Professor of Chemistry, Department of Chemistry, Program in Molecular and Cell Biology, University of Massachusetts, Amherst, MA.

5.2 Profesores, investigadores, conferenciantes visitantes y post-doctorados

Seminarios ofrecidos por profesores visitantes o conferenciantes

<u>Nombre del Conferenciante</u>	<u>Título del Seminario</u>
Dr. Osvaldo Rosario –UPR	CONSIDERACIONES QUIMICAS Y AMBIENTALES EN LA PLANIFICACION DE LAS ALTERNATIVAS ENERGETICAS PARA PUERTO RICO
Dra. Margarita Ortiz UPR-Humacao	New Methodologies for the Synthesis of Alcohols and Amino Derivatives as Nicotinic Receptor Agonists.
Dr. Juan C. Colberg Pfizer Central, Groton, Connecticut	"Late stage process development in Pfizer drug candidates 15

Dr. Karl Matos BASF Inorganics, Evans City PA	"Organometallics in Organic Synthesis: Challenges, Opportunities and Lessons to Develop New Reagents for Pharmaceutical Applications"
Dr. Weston T. Borden Univ of North Texas	"Calculations on Tunneling by Carbon Tell Experimentalists Where to look and what to look for"
Prof. Tong Ren Purdue Univ., West Lafayette, In Wires"	"Linear and Cross-conjugated Organometallic Molecular
Jaroslava Miksovska Depart of Chemistry and Biochem. Florida International University	"Conformational Dynamics in Vertebrates Globins and Peroxidases Studied Using Photothermal Techniques"
Dr. Philip S. Low Purdue University	"Targeted delivery of drugs to cancer cells and sites of inflammation"
Dr. Peter Beiersdorfer Univ. of California, Berkeley	"Progress in the identification and modeling of coronal lines using accurate calculations and measurements"
Dr. Yi Lin National Inst. Aerospace Hampton, VA	"Soluble Boron Nitride nanosheets"
Dr. Francisco Arnaiz Universidad de Burgos, España	Síntesis, caracterización y actividad catalítica de complejos de oxomolibdeno
Dr. Pradip Mascharak Univ. of California – Santa Cruz Santa Cruz, CA	"Designed Photoactive Metal Nitrosyls for Site-specific Nitric Oxide Delivery"
Dr. Jorge Lamboy University of California-San Diego	Protein Intrinsic Disorder Explored by Single-Molecule FRET
Dr. Joseph Barendt Chiral Technologies, Inc. Philadelphia, PA	"Rocks, Wine, and Thalidomide; The Search for Chiral Pharmaceuticals"
Dr. Zhao Cong-Gui Univ of Texas at San Antonio	Enantioselective Synthesis of Biologically Active Molecules for Anticancer and Antimicrotubule Studies.

Profesores investigadores

Professor N. Kurita, Toyohashi University of Technology, Toyohashi, Japan (January 2010 – April 2010) with Dr. Ishikawa

Dr. Francisco Arnaiz-Departamento de Química, Universidad de Burgos, España (Montes).

Post-doctorados

Dr. Chitturi Venkatesuara Rao, NASA EPSCoR Postdoc (August 2009 – August 2012) (Dr. Ishikawa).

Dr. Dmitry Skachkov, IFN Postdoc (May 2011 – May 2012) (Dr. Ishikawa).

Dr. Xin-Yi Cao (Postdoctoral Fellow) (Dr. R. Raptis)

Dr. Ievgen Govor (Postdoctoral Fellow) (Dr. R. Raptis)

Dra. Elsie A. Orellano (UPR – Rio Piedras) (Dr. N.M. Carballeira)

Lenibel Santiago, Ph.D., Postdoctoral Fellow, NASA (Dr. Kai Griebenow)

Dr. Ideliz Negrón Encarnación (Dr. Arce)

Dr. Olga Álvarez Avilés (Dr. Arce)

Dr. Andrew Surman (Dr. Rivera)

5.3 Conferencias y congresos internacionales (incluyendo EEUUA)

C. R. Cabrera, Thermal and Electrochemical Analysis of Electrodeposited Pt Nanoparticles at Nanocarbon Materials, 38th Annual North American Thermal Analysis Society Conference, Philadelphia, PA, August 2010. (invited)

C. R. Cabrera, Transmission Electron Microscopy of Electrodeposited Platinum Nanoparticles at High Surface Area Carbon Bulk Material, 17th International Microscopy Congress, Rio de Janeiro, Brazil, September 2010. (invited)

C. R. Cabrera, "Ammonia Oxidation Enhancement at Square-Wave Treated Platinum Particle Modified Boron-Doped Diamond Electrodes", Electrochemical Society Meeting, Las Vegas, October 2010.

C. R. Cabrera, "Bioelectrochemical Oxidation of Urea with Urease and Platinized Boron Doped Diamond Electrodes", Electrochemical Society Meeting, Las Vegas, October 2010.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : from Li ion anodes to fuel cell catalysts", Georgia Institute of Technology, October 2010.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : from Li ion anodes to (bio) fuel cell catalysts", University of Texas at El Paso, El Paso, Texas, February 2011.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : Synthesis of Fuel Cell Catalysts", New York University, New York, NY, November 2011.

C. R. Cabrera, "Nanostructuring Electrochemical Interfaces : Synthesis of fuel cell catalysts", DOE Brookhaven National Laboratory, Long Beach, NY, November 2011.

C. R. Cabrera, «NASA-University Research Centers : Center for Advanced Nanoscale Materials », NASA Education Stakeholders' Summit, Marriott Westfield Conference Center in Chantilly, VA, November 2011.

Cintrón, G. A., Carballeira N. M., and Cartagena, M. M. "New Synthetic Antiprotozoal Δ^2 -Acetylenic Fatty Acids", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Orellano, E. A., Rosado, K., Cartagena, M., and Carballeira, N. M. "Role of α -Methoxylated Fatty Acids in Retinoic Acid-Differentiated Human Neuroblastoma SH-SY5Y Cells", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Sanabria-Rios, D. J., Fraguera-Rios, J., Montano, N., Carballeira, N. M., and Rodríguez, J. W. "Evaluation of the Antimicrobial Properties of Unsaturated Fatty Acids and their Potential as Bacterial Topoisomerase II Inhibitors", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Montano, N., Carballeira, N. M., and López, R. E. "First Total Synthesis of (5Z,9Z)-18-Methyl-5,9-Nonadecadienoic Acid from the Caribbean Sponge *Pseudospongosorites suberitoides*", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Giménez Moreira L., Orellano, E. A., and Carballeira, N. M. "Synthesis of New Long-Chain Unsaturated Fatty Acids as Potential HIV-1 RT Inhibitors", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Baerga-Ortiz, A., Carballeira, N. M., and Oyola-Robles, D. J. "Improvement of Fatty Acid Production in *Escherichia coli* by Over-Expression of Enzymes from a Bacterial Polyunsaturated Fatty Acid Synthase", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Oyola-Robles, D. J., Carballeira, N. M., and Baerga-Ortiz, A. "Dehydratase Domains and the Formation of Double Bonds in Polyunsaturated Fatty Acids Biosynthesis", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Carballeira, N. M., "Naturally Occurring Lipids as New Inspirational Motifs for Novel Antiprotozoal Compounds", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Oyola-Robles, D. J., Rodriguez-Guilbe, M. M., Bermudez, M.-L., Rivera Diaz, M., Carballeira, N. M., and Baerga-Ortiz, A. "Expression of a Tetradomain Fragment from a Polyunsaturated Fatty Acid Synthase with Dehydratase Activity", Society for Industrial Microbiology (SIM) 2011 Annual Meeting and Exhibition, Sheraton New Orleans, New Orleans, Louisiana, July 24-28, 2011.

Montano, N., Cintrón, G. A., Márquez, C., Fernández-Prada, C., Fernández-Rubio, C., Balaña-Fouce, R., and Carballeira, N. M., "First Total Synthesis and Antiprotozoal Activity of the (Z)-16-Methyl-11-heptadecenoic Acid, a Recently Discovered Novel Fatty Acid from the Sponge *Drummaxia undata*", 241st American Chemical Society National Meeting & Exposition, Anaheim Convention Center, California, March 27-31, 2011.

Carballeira, N. M. "Marine Methoxylated Fatty Acids: Isolation, Synthesis, and Biomedical Potential" Faculty of Physical Sciences, University of Iceland, Reykjavík, Iceland, December 10, 2010.

Chorna, N. E., Chorny, A., Santos, I. J., Montano, N., Carballeira, N., Ortiz Zuazaga H., Pérez, A., and Peña de Ortiz, S. "Effect of Exercise on Fatty Acid Metabolism in Aging Brain", 40th Annual Meeting Neuroscience 2010, San Diego Convention Center, San Diego, California, November 13-17, 2010.

Drug delivery using layered inorganic nanomaterials, **Jorge L. Colón**, Dr. Agustín Díaz, Amanda David, Riviam Pérez, Bárbara Casañas, Julissa González, Millie L. González, Dr. Adriana Báez, Stacey E. Wark, Dr. Paul Zhang, Tiffany B. Kinnibrough, Dr. Abraham Clearfield, 241st ACS National Meeting, Anaheim, California, March 2011

(**J. L. Colón**) Transporte de Droga Mediante Nanomateriales Laminares Inorgánicos, XXIX Congreso Latinoamericano de Química, Cartagena, Colombia, September 2010.

Intercalation of anticancer drugs based on anthracycline antibiotics in zirconium phosphate nanoparticles for drug delivery, Julissa González, Barbara Casañas, Agustín Díaz, Millie González, Adriana Baez, Jorge Colón, 241st ACS National Meeting, Anaheim, California, March 2011.

Atomistic simulation of the aqueous sulfuric acid/ Pt(111) interface as a function of potential, **Yasuyuki Ishikawa**, talk given at the 217th Electrochemical Society Meeting, Vancouver, Canada (April 25 – May 1, 2010)

Relativistic multireference many-body perturbation theory for openshell ions with multiple valence shell electrons, **Yasuyuki Ishikawa**, invited talk given at the 10th International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasma (ASOS10), Berkeley, California (August 3 – 7, 2010).

Ingrid Montes, Hispanic Women Underrepresentation in STEM Fields Presidential Symposium: Women Chemists of Color, 241th ACS National Meeting, Anaheim, March 2011.

Ingrid Montes, Life Stories and Educational Techniques: How to Motivate Students to Become Successful Scientists, at the Universidad Tecnológica de Bolivar, Colombia, September 2010.

Ingrid Montes, Hispanic women: How to rise above challenges and move forward Presidential Symposium: Women Chemists of Color: Staying at the Table Symposium, 240th ACS National Meeting, Boston, August 2010.

R. G. Raptis, "Iron Cluster-Based Magnetic Resonance Imaging (MRI) Contrast Agents" 4th North America-Greece-Cypus Workshop on Paramagnetic Materials, Patras, Greece, June 14-18, 2011.

R. G. Raptis, Redox-Active Octanuclear Complexes Containing Fe₄O₄-Cubanes, University of Texas at El Paso, Department of Chemistry, El Paso, TX, April 7, 2011.

R. G. Raptis, Redox-Active Octanuclear Complexes Containing Fe₄O₄-Cubanes, Florida International University, Department of Chemistry, Miami, FL, April 4, 2011.

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, Florida State University, Department of Chemistry, Tallahassee, FL, Nov. 2, 2010.

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, University of Florida, Department of Chemistry, Gainesville, FL, Nov. 1, 2010.

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, University of Texas at San Antonio, Dept. of Chemistry, San Antonio, TX, Oct. 22, 2010.

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, Texas A&M University, Department of Chemistry, College Station, TX, Oct. 20, 2010.

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, Florida International University, Department of Chemistry, Miami, FL, Sept. 10, 2010. (invitation by the South Florida section of the American Chemical Society).

R. G. Raptis, Polynuclear Iron-Oxo-Pyrazolate Clusters; Possible Metalloprotein Models and MRI Contrast Agents, Florida Atlantic University, Department of Chemistry, Boca Raton, FL, Sept. 9, 2010.

Kenia A. Parga, Indranil Chakraborty and Raphael G. Raptis, "Fe₈-based contrast agents for MRI: Targeting ovarian cancer cells", 240th National Meeting of the American Chemical Society, Boston, MA, August 22-26, 2010.

Logesh Mathivathanan, Yiannis Sanakis and Raphael G. Raptis, "Tuning magnetic interactions in a triangular Cu₃-pyrazolate system", 241st National Meeting of the American Chemical Society, Anaheim, CA, March 27-31, 2011.

Kennett I. Rivero and Raphael G. Raptis, "Iron-Oxo Pyrazolato Clusters Containing a Redox-Active Fe₄O₄ Cubane Core", The 2011 Emerging Researchers National Conference in STEM (AAAS/NSF-HRD), Washington, DC, February 24-26, 2011.

Jorge Torres King, Logesh Mathivathanan, Marlyn Rivera-Carrillo, Arturo J. Hernandez-Maldonado and Raphael G. Raptis, "Triangular Cu(II) pyrazolate based metal organic frameworks", 241st National Meeting of the American Chemical Society, Anaheim, CA, March 27-31, 2011.

Yongfang Chen, College of Advanced Science and Technology, Dalian University of Technology, Dalian, China; July 5, 2011.

Yongfang Chen, Forth Workshop on Computational Nanoscience and New Energy Materials, Chengdu, China, July 1, 2011.

Yongfang Chen, Department of Physics, Dalian University of Technology, Dalian, China, June 2011.

Yongfang Chen, School of Materials Science, Hubei University of Technology, Tianjin, China, June 16, 2011.

Yongfang Chen, Department of Physics, Central China Normal University, Wuhan, China, June 2011.

Yongfang Chen, Department of Physics, Southeastern University, Nanjing, China, June 10, 2011.

hongfang Chen, School of Engineering, Nanjing University, Nanjing, China, June 9, 2011.
ongfang Chen, School of Engineering, Nanjing University, Nanjing, China, June 7, 2011.

ongfang Chen, The 11th National Conference of Quantum Chemistry, Hefei, China, May 28, 2011.

ongfang Chen, Oak Ridge National Lab, Oak Ridge, TN, Aug, 12, 2011.

ongfang Chen, School of Environmental Science and Technology, Dalian University of Technology, Dalian, China, July 27, 2010.

ongfang Chen, 58th MANA Seminar, National Institute for Materials Science, Tsukuba, Japan, July 23, 2010.

ongfang Chen, Institute of New Energy Material Chemistry, Nankai University, Tianjin, China, July 12, 2010.

ongfang Chen, The 9th International Conference on Condensed Matters Theory and Computational Materials Science, Dalian, China, July 7, 2010.

Anna Delgado, Nanyaly Santiago, Karen Ricardo, Tech Chen, Nitzy Muñoz, Nicole Massanet, Lila Solís and **Carlos Torres**, "Supercomputing Conference, SC10, Education Program, New Orleans, Louisiana, Improving learning of Chemistry concepts using Computational Chemistry and Cheminformatics Tools", November 13-16, 2010.

Anna García Berrios, R. Arce, Photodegradation of 1-nitropyrene in different solvents. Annual Conference on More Graduate Education at Mountain States Alliance Student Research Conference 2011, Montana State University, February 8, 2011.

Rafael Gavalda, R. Arce, Nitrofluoranthene excited state reactivity and photochemical nature. 21st American Chemical Society National Meeting, Anaheim, California, March 2011.

Rafael Gavalda, R. Arce, Nitrofluoranthene isomers photochemistry. 21st Inter-American Photochemical Society Conference, Mendoza, Argentina, May 17, 2011.

Rafael Arce, Z. García – Berrios, Effect of solvent properties on the yield of major products in the photolysis of 1-nitropyrene. 21st Inter-American Photochemical Society Conference, Mendoza, Argentina, May 17, 2011.

Rafael Arce, J. M. "Smart Assemblies & Other Adventures in Supramolecular Space" Supramolecular Chemistry Symposium at the 62nd Southeastern/66th Southwest ACS Regional Meeting, New Orleans, LA; December 1, 2010. [Invited]

Rafael Arce, J. M. "Smart Assemblies & Other Adventures in Supramolecular Space" Department of Chemistry, University of Miami, Miami, FL. April 1, 2011. [Invited]

Rafael Arce, J. M. "Smart Assemblies & Other Adventures in Supramolecular Space" Supramolecular Chemistry Symposium at the Middle Atlantic Regional Meeting of the American Chemical Society held at the University of Maryland, College Park, MD; May 21, 2011. [Invited]

Rafael Arce, J. M. "Smart Assemblies & Other Adventures in Supramolecular Space" Supramolecular Reactions and Properties Session at the Gordon Research Conference on Physical Organic Chemistry, Holderness School, Holderness, NH; June 27, 2011. [Invited]

Rafael Arce, R. Mayol, M.M. Garcia, I. Rodriguez, E. Mosquera, A. Herrera, M. Gomez Introducing

noscience Concepts, Techniques, and Skills in the undergraduate curriculum, MRS Fall Meeting 0, Boston, MA 2010.

ond-generation epoxide-based approach for the synthesis of polypropionates", **José A. Prieto**, **Il R. Reyes-Berrios**, **Torres Wildeliz**, 241st ACS National Meeting & Exposition, March 27-31, 1, Anaheim, CA.

dies towards the synthesis of 3,4-epoxy alcohols as precursor for the syn-anti-syn stereotetrad ing the Ireland-Claisen rearrangement", Alejandra Cruz Montañez and José A. Prieto, 42th ACS onal Organic Symposium, June 5-9, 2011, Princeton University, Princeton, NJ.

oxide-based syntheses of the C14–C25 bafilomycin A1 polypropionate fragment, Elizabeth M. entín and José A. Prieto, 42th ACS National Organic Symposium, June 5-9, 2011, Princeton versity, Princeton, NJ.

oxide-based approach: Studies toward the synthesis of mycalolide A., Jaileen Rentas-Torres, enia E. Nieves-Quifones, José A. Prieto, 241st ACS National Meeting & Exposition, March 27-2011, Anaheim, CA.

oxide-based syntheses of the C14-C25 bafilomycin A1 and C₆-C₁₆ elaiolide polypropionate ments, Elizabeth M. Valentin, José A. Prieto PhD, 241st ACS National Meeting & Exposition, ch 27-31, 2011, Anaheim, CA.

on alkoxide mediated cleavage of 3,4-epoxy alcohols with organometallic reagents, Karla M nos, Gerardo Torres, José A Prieto PhD, 241st ACS National Meeting & Exposition, March 27-31, 1, Anaheim, CA.

ects of the remote protecting group in the cleavage of 3,4-epoxy alcohols, Gabriela Fernandez-ervo, Elizabeth Valentin, Gerardo Torres, Jose A. Prieto, 241st ACS National Meeting & osition, March 27-31, 2011, Anaheim, CA.

5.5 Modificaciones al currículo para integrar temas y experiencias educativas internacionales

6. Cultura de evaluación y responsabilidad, y gestión administrativa

6.1 Mejoramiento de los recursos humanos

6.2 Contribuciones a la gestión administrativa

6.3 Avalúo de la efectividad

7. Recursos Tecnológicos de Apoyo a la Investigación, la Docencia y los Procesos Administrativos

7.1 Innovaciones y mejoras a los recursos tecnológicos

7.2 Integración de la tecnología a la investigación y la docencia

8. Infraestructura Física y Espacios Naturales

8.1 Mejoramiento de las instalaciones físicas

8.2 Acceso a las personas con impedimentos

9. Vínculos con la comunidad

9.1 Proyectos de servicio a la comunidad

Rafael Arce –

1. Member of RISE Program External Advisory Committee (NIH), UPR – Medical Science Campus.
2. Local mentor for Drs. A. Alegría, and R. Oyola of the INBRE Program, National Center for Research Resources (NIH)
3. Program Director SCORE (NIH) Program
4. Member of Scientific Committee of the IUPAC 2011 Congress

Carlos Cabrera –

Directed a Nano Summer Camp with 12 High School Students and 2 High School Teachers

Jorge Colón -

1. Mentor in the summer 2011 Project SEED of the American Chemical Society-Puerto Rico Section
2. Member of the UNESCO Chair in Peace Education of the Río Piedras Campus of the University of Puerto Rico
3. Treasurer of the Puerto Rico Section of the American Chemical Society
4. President of the Caribbean Division of the American Association for the Advancement of Science (AAAS)
5. Member of the Board of Directors of the "Colegio de Químicos de Puerto Rico"
6. Member of the "Comité de Educación Continua" of the "Colegio de Químicos de Puerto Rico"
7. Member of the "Comité Técnico" of the "Colegio de Químicos de Puerto Rico"
6. Member of the "Comité de Premios a Estudiantes" of the "Colegio de Químicos de Puerto Rico"
6. President of the Scientific Committee of the 2011 IUPAC World Chemistry Congress
7. Coauthor of the *Science for Haiti: A Report on Advancing Haitian Science and Science Education Capacity*, American Association for the Advancement of Science (AAAS), 2011.

Néstor Carballeira -

1. NIH-NIGMS Minority Programs Review Subcommittee B (MPRC-B)
2. NSF Chemical Synthesis Panel
3. Member of the Board of Examiners of Chemists of Puerto Rico
4. Co-Program Chair IUPAC 2011
5. Associate Editor – *Lipids*

Ingrid Montes -

1. Puerto Rico Coordinator for National Chemistry Week and Chemist Earth Day community service based programs for ACS.
2. Chair of the ACS Puerto Rico Section
3. Coordinator of the International Year of Chemistry-Puerto Rico
4. ACS-Puerto Rico Project SEED Coordinator
5. Chair of the American Chemical Society Theme Team for the International year of Chemistry celebration.
6. Representative of the American Chemical Society at the IUPAC 2011 Organizing Committee.
7. Chair of the Outreach Committee at the IUPAC 2011 Organizing Committee
8. Member of Committee on Committees- American Chemical Society
9. Member of the Editorial Advisory Board, Journal of Chemical Education.
10. Member of the American Chemical Society, Advisory Board for ChemMatters Magazine, Chair from 2007-09.

Edwin Quiñones –

Member, Search Committee of the Chairperson of the Department of Chemistry, May 2011.
Member, Search Committee of the Dean of Academic Affairs, UPR Academic Senate, September 2011.

Zhongfang Chen-

Member of editorial boards

- *Insciences-Nanotechnology*
- *Journal of Nanoscience Letters*

Member of the organizing committee of the conferences

- Workshop on Computational Nanoscience and New Energy Material, Chengdu, China, July, 2011.
- Workshop on Computational Nanoscience and New Energy Material, Taiwan, China, October 2010.

Francisco Echegaray -

1. Echegaray, F. J. (2011, 3 de marzo). Cuando la química es... ¡una delicia! El Nuevo Día, p. 76.
2. Echegaray, F. J. (2011, 7 de junio). Pintando el fuego. El Nuevo Día, p. 81.

Carlos Torres -

Collaboration with the 'Colegio de Químicos de PR' offering the reviews for the Chemists "revalida" in the areas of General Chemistry (21 hours) and Physical Chemistry (21 hours).

Liz Diaz -

Over 10 high school students have been helped in the development of their science fair project.

Chemistry interactive activities have been performed with elementary school students

9.2 Actividades e iniciativas para establecer enlaces con los exalumnos

9.3 Actividades e iniciativas para obtención de fondos externos

Ingrid Montes -ACS Challenge Grant -International Year of Chemistry / IUPAC World Congress Are women still underrepresented in Science?

K. Griebenow, PI, Co-PDs (various PIs) 2011-2016 DoD \$5,000,000, UPR-UGA Partnership for a Research Center for Excellence in Renewable Energy.

Zhongfang, Chen, Team Member, *Adaptive Cyberinfrastructure for Transformative Research: Computational Materials for Energy Technologies*, NSF, \$ 6M, 08/01/2010-07/31/2012.

Zhongfang, Chen, Overseas Expert, *The 111 Plan of Attracting Talents*, NSF of China, Chinese Yuan 9M, 01/01/2012-12/31/2016 (my share is to support one visiting student from China for one or two years)

Zhongfang, Chen, PI, *Computational Quest for Nanocatalysts with Novel Zeolitic Carbon Support for Bioethanol Production*, subaward of Oak Ridge National Lab, \$25,000, 06/01/2010 – 05/31/2011.

Zhongfang, Chen, PI, ORNL Faculty Summer Research Program, 10-week summer support, 06/07/2010-08/13/2010.

Zhongfang, Chen, PI, *Computational Explorations of Boron Nitride Monolayer Nanostructures for Aerospace Applications*, NASA SEED Program, \$ 30,000, 2010.

Zhongfang, Chen, PI, Computational Modeling of Nanotoxicity, \$ 12K, FIPI (UPR internal grant).

Griebenow, K. PI (Diaz-Vazquez, L.M. Co PI with other 5) "PR-UGA Partnership for a Research Center of Excellence in Renewable Energy", US Department of Defense HSI Center of Excellence, (\$ 4 million). 2011- 2014

Miller Mark W. , Treitstman, S; Marie-Bordes, J.; Sosa, M. PIs (Diaz-Vazquez, L.M., participating Faculty with other 5) "Puerto Rico Center for environmental neuroscience"(\$1,985,001) CREST Program NSF, 2011-2013.

National Institutes of Health-SCoRE Program, NIH National Institute of General Medical Sciences, "Synthesis of Polypropionate Antibiotics via Oxirane Chemistry", Principal Investigator: **José A. Prieto** Type: SC1 (2S06GM-08102-29). Period: March 1, 2010-February 28, 2014; \$900,000.

Informe Anual Departamento de Química Año Académico 2011-2012

1. Investigación

1.1 Proyectos de investigación

Una descripción detallada de los proyectos de investigación que actualmente se llevan a cabo en el Departamento de Química se puede encontrar en la siguiente página en el web <http://chemistry.uprrp.edu>. Se incluyen proyectos de investigación interdisciplinarios que cubren todas las áreas de la Química.

1.2 Publicaciones

Más de 60 publicaciones a nivel internacional se reportaron en el Departamento de Química durante el periodo de agosto 2011 a julio 2012. Se destaca una alta cantidad de artículos tanto en el área computacional como en electroquímica. Para ver una lista parcial de las publicaciones reportadas por los profesores durante este periodo ver la lista que se detalla a continuación.

Kazakov, D. V.; Timerbaev, A. R.; Safarov, F. E.; Nazirov, T. I. ; Kazakova, O. B.; Ishmuratov, G. Y. ; Terent'ev, A. O.; Borisov, D. A.; Tolstikov, A. G.; Tolstikov, G. A.; **Adam, W.** "Chemiluminescence from the Biomimetic Reaction of 1,2,4-Trioxolanes and 1,2,4,5-Tetroxanes with Ferrous Ions", *RSC Advances*, **2012**, 2, 107-110.

Nicolau, E.; Mendez, J.; Fonseca, J. J.; Griebenow, K.; **Cabrera, C. R.**, Bioelectrochemistry of non-covalent immobilized alcohol dehydrogenase on oxidized diamond nanoparticles. *Bioelectrochemistry* **2012**, 85, 1-6.

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La-Torre-Riveros, L.; Guzman-Bas, R.; Mendez-Torres, A. E.; Prelas, M.; Tryk, D. A.; **Cabrera, C. R.**, Diamond Nanoparticles as a Support for Pt and PtRu Catalysts for Direct Methanol Fuel Cells. *Acs Applied Materials & Interfaces* **2012**, 4 (2), 1134-1147.

Santiago-Rodriguez, L.; Mendez, J.; Flores-Fernandez, G. M.; Pagan, M.; Rodriguez-Martinez, J. A.; **Cabrera, C. R.**; **Griebenow, K.**, Enhanced stability of a nanostructured cytochrome c biosensor by PEGylation. *Journal of Electroanalytical Chemistry* **2011**, 663 (1), 1-7.

Rao, C. V.; **Cabrera, C. R.**; **Ishikawa, Y.**, Graphene-Supported Pt-Au Alloy Nanoparticles: A Highly Efficient Anode for Direct Formic Acid Fuel Cells. *Journal of Physical Chemistry C* **2011**, 115 (44), 21963-21970.

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"A urea bioprobe based on platinized boron-doped diamond electrodes: A possible aid for the early diagnosis of renal diseases", J. J. Fonseca-Vega, E. Nicolau and **C. R. Cabrera**, Ed. R.J. Tremont, Recent Advances in Electrochemical Research, ISBN: 978-81-7895-545-2, Transworld Research Network, 2012. Pga. 39-73.

N. M. Carballeira, M. Cartagena, D. Sanabria, D. Tasdemir, C. F. Prada, R. M. Reguera, and R. Balaña-Fouce "2-Alkynoic Fatty Acids Inhibit Topoisomerase IB from *Leishmania donovani*", *Bioorg. Med. Chem. Lett.*, **22**, 6185-6189 (2012).

N. M. Carballeira, M. Cartagena, F. Liu, Z. Chen, C. F. Prada, E. Calvo-Alvarez, R. M. Reguera, and R. Balaña-Fouce "First Total Synthesis of the (\pm)-2-Methoxy-6-heptadecynoic Acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", *Pure Appl. Chem.*, **84**, 1867-1876 (2012).

N. M. Carballeira, N. Montano, G. A. Cintrón, C. Márquez, C. Fernández-Prada, C. Fernández-Rubio, and R. Balaña-Fouce "First Total Synthesis and Antiprotozoal Activity of the (Z)-16-Methyl-11-heptadecenoic Acid, a Recently Discovered Novel Fatty Acid from the Sponge *Dragmaxia undata*", *Chem. Phys. Lipids*, **164**, 113-117 (2011).

H. Kirmizibekmez, I. Atay, M. Kaiser, R. Brun, M. M. Cartagena, N. M. Carballeira, E. Yesilada, and D. Tasdemir "Antiprotozoal Activity of *Melampyrum arvense* and its Metabolites", *Phytother. Res.*, **25**, 142-146 (2011).

Yafei Li, Fengyu Li, Zhongfang Chen*, Graphane/Fluorographene Bilayer: Considerable C-H \cdots F-C Hydrogen Bonding and Effective Band Structure Engineering, *J. Am. Chem. Soc.* **2012**, *134*, 11269–11275.

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Fengyu Li, Jijun Zhao, Zhongfang Chen*, Fe-Anchored Graphene Oxide: A Low-Cost and Easily Accessible Catalyst for Low-Temperature CO Oxidation, *J. Phys. Chem. C* **2012**, *116*, 2507-2514.

Yunlong Liao, Clara Leticia Cruz, Paul von Ragué Schleyer, Zhongfang Chen*, Many M@Bn Boron Wheels are Local, but not Global Minima, *Phys. Chem. Chem. Phys.* **2012**, *14*, 14898-14904.

Zhongfang Chen*, Judy I. Wu, Clémence Corminboeuf, Jonathan Bohmann, Xin Lu, Andreas Hirsch, Paul von Ragué Schleyer*, Is C₆₀ Buckminsterfullerene Aromatic? *Phys. Chem. Chem. Phys.* **2012**, *14*, 14886-14891.

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Fengyu Li, Lu Wang, and Jijun Zhao,* Rui-Hua Xie, Kevin E. Riley, **Zhongfang Chen ***, What is the Best Density Functional to Describe Water Clusters: Evaluation of Widely Used Density Functionals with Various Basis Sets for (H₂O)_n (n=1-10), *Theor. Chem. Acc.* **2011**, 130, 341-352.

Fengyu Li, Peng Jin, Lu Wang, De-en Jiang, Shengbai Zhang, Jijun Zhao,* **Zhongfang Chen***, B₈₀ and B₁₀₁₋₁₀₃ Clusters: Remarkable Stability of the Core-shell Structures Established by Validated Density Functionals, *J. Chem. Phys.* **2012**, 136, 074302.

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“Luminescence Rigidochromism and Redox Chemistry of Pyrazolate-Bridged Binuclear Platinum(II) Diimine Complex Intercalated into Zirconium Phosphate Layers”, Eladio J. Rivera, Cindy Barbosa, Rafael Torres, Harry Rivera, Estevao R. Fachini, Tyler W. Green, and William B. Connick, and **Jorge L. Colón**, *Inorg. Chem.* 2012, 51, 2777-2784.

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Nicolau E, Mendez J, **Griebenow K**, Cabrera CR (2012) Bioelectrochemistry of non-covalent immobilized alcohol dehydrogenase on oxidized diamond nanoparticles. *Bioelectrochem.* 85:1-6.

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Theoretical wavelengths of Fe XVI L-shell transitions and comparison with laboratory measurements and Chandra observations of Capella, P. Beiersdorfer, Francisco Diaz, **Yasuyuki Ishikawa**, *Astrophysical Journal*, 745, 167 (2012).

Effect of hydration on electrical conductivity of DNA duplex: Green’s function study combined with DFT, Yaku Maeda, Akisumi Okamoto, Yasuhiro Hoshiba, Takayuki Tsukamoto, **Yasuyuki Ishikawa** and Noriyuki Kurita, *Computational Materials Science*, 53 (2012) 314.

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1.3 Obra Creativa

La obra creativa en el Departamento de Química también se manifestó en la creación de manuales para laboratorios de enseñanza y en la producción de ideas científicas tan innovadoras como meritorias de solicitud de patentes. Algunos ejemplos específicos se señalan a continuación.

1.4 Ponencias y conferencias locales

Se destacan durante este periodo más de 25 ponencias y conferencias locales. Los profesores del Departamento han dictado charlas en otras instituciones de educación superior dentro de Puerto Rico. Continúa siendo la participación local preferida de los estudiantes graduados y subgraduados los Junior y Senior Technical meetings auspiciados por la sociedad del ACS local. Para una lista parcial de esta participación ver la lista que se incluye.

1.5 Investigación de Estudiantes

Los estudiantes subgraduados se destacaron por su participación en proyectos de investigación auspiciados por los programas AMP, MARC y RISE. Hubo una alta participación estudiantil subgraduada en estos programas.

2. Programas Académicos

2.1 Evaluación y revisión de los programas académicos

El programa que recibió mayor evaluación durante este periodo fue el programa doctoral graduado. En dicho programa se invirtió el orden de la presentación de la propuesta A y el seminario graduado con miras a acelerar el tiempo de graduación de los estudiantes graduados.

2.2 Cambios en los programas

Debido a la evaluación anterior ahora los estudiantes graduados deben presentar su propuesta A antes de presentar su seminario graduado. Este cambio se realizó y está siendo evaluado para su efectividad. Este ha sido el cambio curricular más significativo durante este periodo.

2.3 Revisión curricular de los programas

El programa subgraduado de química continúa bajo el nuevo bachillerato.

2.4 Avalúo del aprendizaje

Durante el año académico 2010-2011, el Programa Subgraduado de Química, con el visto bueno de la Oficina de Evaluación del Aprendizaje Estudiantil (OEAE) en la UPR-RP, decidió realizar avalúo del aprendizaje estudiantil en los primeros cinco dominios del Recinto, que incluyen: (1) Capacidad crítica, (2) Comunicación efectiva, (3) Investigación y creación, (4) Capacidad para el estudio independiente, y (5)

Responsabilidad social. En adición, se realizó avalúo en los dos dominios del Programa de Química, que incluyen: (1) Contenido de la disciplina, y (2) Destrezas de laboratorio.

Para cada dominio en donde se realizó avalúo, se redactaron unos objetivos de aprendizaje estudiantil y se diseñaron unas actividades o instrumentos para medir el logro alcanzado en cada objetivo. El avalúo del aprendizaje se midió en tres instancias de la trayectoria académica de los estudiantes del Programa de Química. La primera instancia corresponde al curso de Química General (Q3001-2), la segunda instancia corresponde al curso de Química Orgánica (Q3451-2) o Química Analítica (Q3255), y la tercera instancia corresponde al curso de laboratorio de Análisis Instrumental (Q4015L) o de Química Física (Q4041-4). El Profesor del curso participante del avalúo envió la data de avalúo mediante correo electrónico, y ésta se analizó usando Microsoft Excel. Al comparar el hallazgo de avalúo en cada curso participante, con el indicador de logro propuesto para cada objetivo de aprendizaje estudiantil, se pudo evaluar si los estudiantes del curso cumplieron con las expectativas propuestas en el indicador de logro. Los Profesores tomaron diversas acciones transformadoras necesarias para mejorar el aprendizaje en sus cursos. Para más detalles, favor de consultar el Informe Anual de "Assessment" del Aprendizaje Estudiantil 2010-2011 del Programa Subgraduado de Química. Los dominios de Destrezas de Información y Curiosidad Intelectual se incorporarán en el avalúo del aprendizaje estudiantil para el año 2011-2012.

2.5 Cambios e innovaciones en los programas

A. Cambios en los laboratorios de Química Analítica como parte de la revisión curricular del curso QUIM 3255 bajo la propuesta de MSEIP (2009-2011)

Se usaron fondos del Minority Science and Engineering Improvement Program (MSEIP) para la adquisición e implantación de una red de adquisición de datos (*Measurenet*) para los dos laboratorios de Química Analítica (CN-304 y CN-306). Con dicho sistema se adquirió la siguiente instrumentación:

- Cromatógrafo Líquido de Alta Eficiencia (HPLC)
- Cromatógrafo de Gas con detección termal (GC-TD)
- Colorímetro
- Espectrofotómetro (UV-Vis)
- Electrodo de pH y Electrodo Selectivo a fluoruro
- Detector óptico para conteo de gotas en titulaciones automáticas

Esta infraestructura apoyó una iniciativa para revisar la oferta curricular del laboratorio incluyendo la introducción de 12 proyectos especiales que los estudiantes realizan de manera independiente durante el último mes del curso. El propósito del proyecto es lograr que los estudiantes entiendan y apliquen el proceso analítico para la determinación cuantitativa de sustancias en muestras reales.

B. Curso Química Medicinal (QUIM 5995)

Durante el segundo semestre de 2010-11 la Dra. Rosa Betancourt-Pérez enseñó por primera vez en el Departamento de Química un curso de Química Medicinal. El curso requirió un año de Química Orgánica y un año de Química General y la mayoría de los estudiantes que lo tomaron eran sub-graduados. Los estudiantes estudiaron los principios multidisciplinarios que forman parte del diseño moderno de drogas. Pudieron aplicar los principios químicos que son fundamentales en la "Química Medicinal", tal como la relación entre estructura molecular y actividad biológica. Desarrollaron conocimiento sobre los procesos involucrados en la acción de los fármacos. El curso se enseñó mediante conferencias, trabajos en clase, asignaciones y presentaciones por estudiantes. Cada estudiante realizó una investigación sobre un medicamento y lo presentó de forma oral y escrita. La investigación incluyó las siguientes áreas:

Estructura química y propiedades físicas; Descubrimiento/ Aislación/ Síntesis; Compañía que lo fabrica; Clasificación o categoría terapéutica; modo de administración; distribución; metabolismo; mecanismo de acción; efectos secundarios/ toxicidad; eliminación.

2.6 Acreditación

El programa de bachillerato de Química continúa acreditado por la American Chemical Society (ACS).

2.7 Recursos para la docencia

Los laboratorios de Química fueron renovados y durante este año académico se terminaron de acondicionar para mejorar los ofrecimientos en Química General, Química Orgánica, Química Analítica, Química Física y Química Instrumental. Se comparte el laboratorio de Química Instrumental con el programa de Ciencias Ambientales en donde se adquirió nueva instrumentación para dicho laboratorio, en particular un ICP-MS.

3. Facultad

3.1 Perfil y Reclutamiento

Durante este periodo solo se reclutó un personal docente para el Departamento de Química, es decir la Dra. Liz Díaz en el área de Educación en Química. Se perdieron tres profesores a nivel de Catedrático Auxiliar en las áreas de Bioquímica (2) y Química Computacional (1) añadido al hecho de que se retiró un docente en el área de Educación en Química. Nuevos esfuerzos se deben hacer para reemplazar este personal. Las áreas que necesitan reclutamiento son Bioquímica y Química Analítica.

3.2 Mejoramiento profesional

Los profesores del Departamento de Química asistieron a varios talleres de mejoramiento profesional. Un área favorecida fue la de presentación y evaluación de propuestas externas para así fortalecer la capacidad de la facultad en la obtención de fondos externos. Algunas de estas actividades se detallan a continuación.

Dr. José Rivera

NSF workshop "Science: Becoming the Messenger" (Training for informal science education to reach a broader public about their scientific work.) December 12th, 2011, San Juan, Puerto Rico.

Dr. José A. Prieto

Grant Writer' Seminar & Workshops LLC, sponsored by NIH INBRE, a one day Workshop titled "Develop a Competitive Application Step-by-Step" on Friday May 11, 2012.

3.3 Reconocimientos

La Facultad del Departamento de Química recibió varios reconocimientos durante este periodo. Se destaca el reconocimiento internacional de la Dra. Montes como Fellow del ACS y el 2012 ACS Volunteer Service Award. A continuación se detallan los mismos.

Z. Chen, National Distinguished Overseas Expert, The 111 Plan of Attracting Talents, China
 Z. Chen, "Haitian Scholar" and "Visiting Professor", Dalian University of Technology, Dalian, China
 Z. Chen, Keynote speaker, ChinaNANO 2011, Beijing, China

4. Estudiantes

4.1 Perfil y reclutamiento de estudiantes

Programa subgraduado

En este año académico un total de 87 estudiantes fueron admitidos al programa subgraduado de Química. Se mantuvo un cupo máximo de 100 estudiantes.

Programa graduado

Un total de 35 estudiantes solicitaron al programa graduado durante el año académico 2010-2011. De este número de estudiantes un total de 9 solicitudes fueron denegadas y un total de 10 estudiantes finalmente se matricularon para un 29%. De los estudiantes aceptados 3 venían de UPR-Cayey, 5 de UPR-Rio Piedras, 1 de UPR-Humacao y 1 de UPR-Arecibo.

4.2 Servicios y actividades estudiantiles

4.3 Logros estudiantiles

Estadísticas de graduandos del año 2011-12 del departamento de Química

	Primer semestre Concedidos el 21 de diciembre de 2011	Segundo semestre Concedidos el 18 de junio de 2012	Verano Concedidos el 23 de julio de 2012	Total en tres sesiones
Total de estudiantes graduados	4	41	4	49
Mujeres (%)	4 (100%)	27 (66%)	4 (100%)	35 (71%)
Hombres (%)	0 (0%)	14 (34%)	0 (0%)	14 (29%)
Certificación del ACS	2 (50%)	22 (54%)	2 (50%)	26 (53%)
Estudiantes que investigaron	2 (50%)	36 (88%)	3 (75%)	41 (84%)
Estudiantes que tienen requisitos para solicitar la licencia de Químico	3 (75%)	35 (85%)	3 (75%)	41 (84%)
Número de años promedio para terminar	6.25	5.65	6	5.7
Promedio de graduación	3.22	3.26	3.23	3.25
Promedio de concentración	2.61	3.06	2.62	2.99
Honores: Summa Cum Laude	0	0 (10%)	0	0
Honores: Magna Cum Laude	0	15 (37%)	0	15 (31%)
Honores: Cum Laude	1 (25%)	7 (17%)	1 (25%)	9 (18%)
Total de honores	1 (25%)	22 (54%)	1 (25%)	24 (49%)

En la graduación de junio de 2012, cinco estudiantes obtuvieron premios:

Juan Corchado García obtuvo el premio de la Facultad de Ciencias Naturales, el Premio del colegio de Químicos y fue recomendado para la medalla de la Asociación de Exalumnos del Recinto de Río Piedras.

Ana V. Morales de Echegaray obtuvo el Premio Joseph Axtmayer.
Adriana Rodríguez Vázquez obtuvo el Premio Isidoro Alberto Colón.
Yashira L. Negrón y Jean C. Rivera Ríos obtuvieron el Premio Merk.

Resumen de estos datos que puede incorporarse al informe.

En el año académico 2011-12, 49 estudiantes obtuvieron el Bachillerato en Ciencias con concentración en Química. De estos 35 (71%) son mujeres y 14 (29%) hombres. El promedio de años para obtener el grado fue de 5.7. De los 49 graduados, 26 (53%) obtuvieron la certificación del ACS. El número de estudiantes que se graduó con los requisitos para solicitar la licencia de Químico fue 41 (84%). El número de estudiantes que investigó fue 41 (84%). El promedio de graduación fue 3.25 y el de concentración 2.99. El número de estudiantes que se graduó con honores fue 24 (49%). En la graduación de junio de 2012 Juan Corchado García obtuvo el premio de la Facultad de Ciencias Naturales.

4.4 Tesis doctorales completadas y aprobadas

Se graduaron 11 estudiantes a nivel doctoral y 0 a nivel de maestría. Ver lista adjunta.

1.	Fernando González	Ph.D.	Agosto 2004	Analítica
2.	Rocío Cardona	Ph.D.	Agosto 2004	Bioquímica
3.	Jennifer Quiñones	Ph.D.	Agosto 2004	Analítica
4.	Dachun Huang	Ph.D.	Agosto 1997	Física
5.	Mónica Fernández	Ph.D.	Agosto 2004	Física
6.	Rubén Delgado	Ph.D.	Enero 1998	Física
7.	Giselle M. Flores	Ph.D.	Agosto 2005	Bioquímica
8.	Eduardo Nicolau	Ph.D.	Agosto 2005	Analítica
9.	Soma Das	Ph.D.	Enero 2006	Inorgánica
10.	Lisandra Arroyo	Ph.D.	Agosto 2004	Analítica
11.	Mariana Martí	Ph.D.	Enero 2005	Orgánica

4.5 Revalida y certificaciones

Los estudiantes de Química del Recinto de Río Piedras continúan obteniendo el mejor por ciento de aprobación de los exámenes de reválida ofrecidos por la Junta Examinadora de Químicos de Puerto Rico. El por ciento de aprobación ronda entre el 44% y el 98%. En la reválida ofrecida en el mes de abril del 2012 nueve estudiantes tomaron el examen de reválida mientras que ocho lo aprobaron en Química Analítica, cuatro en Química Física, seis en Química General y cinco en Química Orgánica.

5. Internacionalización del Recinto

5.1 Proyectos y alianzas de carácter internacional

Se destacan en el Departamento las colaboraciones a nivel internacional. El 70% de la facultad reporta colaboraciones con centros de investigación y universidades en Estados Unidos, mientras un porcentaje significativo de colaboraciones toma lugar con universidades europeas (17%) y con universidades orientales como en China (13%). Podemos decir que la internacionalización del Departamento es bastante alta. Algunos ejemplos de colaboraciones internacionales se presentan a continuación.

Dr. Waldemar Adam -

Prof. Dr. Dmitri Kazakov, Institute of Organic Chemistry, Ufa Scientific Center of the Russian Academy of Science, Ufa, Russia.

Prof. Dr. Heiko Ihmels, Department Chemie – Biologie, Universität Siegen, Siegen (Germany).

Prof. Dr. Thomas Oppenländer, Department of Processing Engineering, University of Applied Sciences, Furtwangen, Germany

Dr. Carlos Cabrera –

Characterization of alkaline membranes for fuel cell applications by polarization curves. National Center for Polymer Research, University of Massachusetts (UMASS) at Amherst. Laboratory of Dr. Bryan Coughlin.

Preparation and Characterization of CeO_x-based nanorods and its applications in fuel cells in alkaline medium. University of Nebraska, Lincoln (UNL), NE, USA. Laboratory Dr. Barry Cheung.

Dr. Juan Feliú- Universidad de Alicante.

Dr. Michael Ward- New York University, Chemistry Department.

Dr. Nestor M. Carballeira –

1. Dr. Rafael Balaña – Fouce (University of León, Spain)
2. Dr. Deniz Tasdemir - National University of Ireland, Galway
3. Dra. Georgina Tonarelli – Santa Fe, Argentina
4. Dr. Adriano D. Andricopulo – Institute of São Carlos (IFSC) of the University of São Paulo (USP), Brazil

Dr. Zhongfang Chen -

1. Zhen Zhou (Nankai University, China)
2. Jijun Zhao (Dalian University of Technology, China)
3. Paul v. R. Schleyer (University of Georgia, USA)
4. Clémence Corminboeuf (Ecole polytechnique federale de Lausanne, Switzerland)
5. Jonathan Bohmann (Southwestern Research Institute, USA)
6. Xin Lu (Xiamen University, China)
7. Andreas Hirsch (University of Erlangen, Germany)
8. De-en Jiang (Oak Ridge National Lab, USA)
9. Xiao Cheng Zeng (University of Nebraska, USA)
10. Shengbai Zhang (Rensselaer Polytechnic Institute, USA)

Dr. Kai Griebenow -

1. Gabriel Barletta, UPR Humacao
2. Carlos R. Cabrera - UPR-RP
3. Robert Langer, MIT
4. Alexander Klibanov, MIT

Dr. John A. Soderquist -

Professors Houk (UCLA), Singleton (TAMU), Pellegrinet (UNR) are collaborating with us on computational analyses of various organoborane conversions with our BBDs.

Dr. José Rivera -

Vincent M. Rotello, Ph.D. Charles A. Goessmann Professor of Chemistry, Department of Chemistry, Program in Molecular and Cell Biology, University of Massachusetts, Amherst, MA.

Eduardo Rósa-Molinar, Ph.D. Associate Professor, Julio García Díaz Center for Investigations in Biology, Department of Biology, University of Puerto Rico-Río Piedras, Río Piedras, PR.

Christoph A. Schalley, Ph.D. Professor, Institut für Chemie und Biochemie der Freien Universität, Organische Chemie, Takustr. 3, 14195 Berlin, Germany.

Amar H Flood, Ph.D. Associate Professor, Department of Chemistry, Indiana University, Bloomington, Indiana.

Dr. Raphael Raptis -

Dr. Yiannis Sanakis, Institute of Materials Science, NCSR "Demokritos", Athens, Greece.

Prof. John E. McGrady, University of Oxford, UK.

Prof. Guang Yang, College of Chemistry and Molecular Engineering, Zhengzhou, China.

Prof. Ricardo González-Méndez, UPR School of Medicine, San Juan, PR.

Dr. Jim Kløstergaard, M.D. Anderson Cancer Center, Houston, TX.

Dr. Ross McDonald, Los Alamos National Laboratories, Los Alamos, NM.

Dr. John Singleton, Los Alamos National Laboratories, Los Alamos, NM.

Dr. Tsu-Chien Weng, Stanford Synchrotron Radiation Laboratory, Palo Alto, CA.

Dr. Dennis Nordlund, Stanford Synchrotron Radiation Laboratory, Palo Alto, CA.

5.2 Profesores, investigadores, conferenciantes visitantes y post-doctorados

Seminarios ofrecidos por profesores visitantes o conferenciantes

Profesores investigadores

Varios profesores nos visitaron durante este año académico con estancias prolongadas. Algunos se muestran a continuación.

Professor **Guang Yang**, College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou, 450001 China; July – September 2012 (with Dr. Raphael Raptis).

With Dr. Yasuyuki Ishikawa

Dr. Peter Beiersdorfer, Lawrence Livermore National Lab. (January 8, 2012 through May 3, 2012)

Dr. Jaan Lepson, Space Sciences Laboratory, University of California – Berkeley (January 8, 2012 through May 3, 2012)

Dr. Patrick Palmeri, University of Liege, Belgium (January 2012)

Dr. Pascal Quinet, University of Mons, Belgium (January 2012)

Algunos de los estudiantes postdoctorales en el Departamento de Química durante este año se muestran a continuación.

Dr. Jose Rivera

Dr. Andrew James Surman (2011/05-2012/04)

Dr. Peddabuddi Gopal (2011/12-present)

Dr. Yasuyuki Ishikawa

Dr. Chitturi Venkatesuara Rao, NASA EPSCoR Postdoc (August 2009 – August 2012).

Dr. Dmitry Skachkov, IFN Postdoc (May 2011 – Dec. 2012).

5.3 Conferencias y congresos internacionales (incluyendo EEUUA)

Dr, Carlos Cabrera

“Nanostructuring Electrochemical Interfaces: from Li ion anodes to (bio) fuel cell catalysts”, University of Puerto Rico at Humacao, **September 2011**.

“Nanostructuring Electrochemical Interfaces: from Li ion anodes to (bio) fuel cell catalysts”, University of Turabo, Caguas, PR, **October 2011**.

“Nanostructuring Electrochemical Interfaces: Synthesis of Fuel Cell Catalysts”, New York University, New York, NY, **November 2011**.

“Nanostructuring Electrochemical Interfaces: Synthesis of fuel cell catalysts”, DOE Brookhaven National Laboratory, Long Beach, NY, **November 2011**.

NASA-University Research Centers : Center for Advanced Nanoscale Materials, NASA Education Stakeholders' Summit, Marriott Westfield Conference Center in Chantilly, VA, **November 2011**.

“Doped Diamond Nanoparticles as a Support for Pt and PtRu Catalysts for Direct Methanol Fuel Cells”, Materials Research Society Meeting, San Francisco, CA, **April 2012**.

“Diamond Nanoparticles as Catalyst Support for Direct Methanol Fuel Cells”, New Diamond and Nano Carbons Conference, San Juan, PR, **May 2012**.

"Nanostructured Electrochemical Interfaces: Synthesis of Fuel Cell Catalyst/Support Systems", XXVII Congreso de la Sociedad Mexicana de Electroquímica and 5th Meeting of the Mexican Section of The Electrochemical Society, 11-15, Toluca, México, **June 2012**.

Students under Carlos Cabrera

Arroyo-Ramirez, Lisandra; **Cabrera, Carlos R.** "Kinetics and Mechanism of Oxygen Reduction Reaction at Carbon-Supported Palladium Catalysts Using Rotating Ring Disk Electrode", **221st Electrochemical Society (ECS) Meeting**; Seattle, Washington (May 2012)

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Nanoshells on HOPG Surfaces for Oxygen Reduction Reaction", **2012 MRS Spring Meeting**; San Francisco, California (April 2012).

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Nanoshells on HOPG Surfaces for Oxygen Reduction Reaction", **2012 NASA Puerto Rico Space Grant Consortium Annual Meeting**; San Juan, Puerto Rico (February 2012).

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Raptis, Raphael; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Nanostructures on Carbon Surfaces for Oxygen Reduction Reaction", **External Advisory Board and NASA Technical Review**; San Juan, Puerto Rico (January 2012).

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Raptis, Raphael; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Nanostructures on Carbon Supports for Oxygen Reduction Reaction", **Workshop on Emerging Materials for Thin Film Solar Cells**; Santa Barbara, California (August 2011).

Feliciano, Ileana; Arroyo-Ramirez, Lisandra; Díaz, Diana C.; Cunci, Lisandro; Rivera, Nelson; **Cabrera, Carlos R.** "Unsupported Palladium Nanoparticles for Ethanol Oxidation in Alkaline Medium", **221st Electrochemical Society (ECS) Meeting**; Seattle, Washington (May 2012).

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Raptis, Raphael; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Nanostructures on Carbon Supports for Oxygen Reduction Reaction", **43rd IUPAC World Chemistry Congress**; San Juan, Puerto Rico (August 2011).

Arroyo-Ramirez, Lisandra; Rodríguez, Diego; Raptis, Raphael; Otaño, Wilfredo; **Cabrera, Carlos R.** "Palladium Electrocatalysts on Carbon Supports for Oxygen Reduction Reaction", **INCREASE Workshop at SLAC National Laboratory**; Menlo Park, California (July 2011).

Lisandra Arroyo, International Center for Materials Research (ICMR) Travel Award (2011) (Workshop: Emerging Materials for Thin Film Solar Cells by ICMR; University of California, Santa Barbara).

Christian Menendez, 2011 Puerto Rico NSF/RII EPSCoR Annual Meeting, September **2011**, El Conquistador Resort, Fajardo, P.R. "Electro-deposition of platinum and cerium oxide by chronoamperometry and applications in fuel cells".

Christian Menendez, The Annual Best Practices Conference on Teaching and learning, October 21st, **2011**, Inter-American University, San Juan, Puerto Rico.

Christian Menendez, PRISM & Junior ACS technical meeting, March 10th, 2012, University of Puerto Rico at Carolina. "Bringing Research into Classroom: An electrochemistry approach" in 32nd PR Interdisciplinary scientific Meeting (PRISM 2012).

Christian Menendez, 2012 MRS Spring Meeting, San Francisco, CA. April 9-13, 2012. **Oral Presentation:** "An Educational Module to determine what is the Role of an Electrolyte in an electrochemical cell?"

Christian Menendez, 2012 MRS Spring Meeting, San Francisco, CA. April 9-13, 2012. **Poster Presentation:** "Preparation and Characterization of platinum/ceria based catalysts and its use for methanol electro oxidation in alkaline medium".

Christian Menendez, NSF Site-visit, University of Massachusetts, Amherst, MA. May 3rd, 2012, **Poster Presentation:** "Preparation and Characterization of platinum/ceria based catalysts and its use for methanol electro oxidation in alkaline medium".

Rolando Guzmán-Blas, Pt/CeO₂ catalyst preparation by impregnation method for DMFC, DEFC and PEMFC; 1era. Jornada de Investigación Estudiantil-DEGI,UPR-Rio Piedras, San Juan-PR; April 24,2012

Ileana Feliciano, "Unsupported Palladium Nanoparticles for Ethanol Oxidation in Alkaline Medium".

Ileana Felicianos- Ramos, Lisandra Arroyo-Ramírez, Diana C. Díaz-Cartagena, Lisandro Cunci, Nelson Rivera-Vélez and **Carlos R. Cabrera** en *221th ECS , Seattle, Washington (oral), mayo 2012*.

"Synthesis of Palladium Nanoparticles via Chemical Reduction for Ethanol Oxidation in Alkaline Medium" Ileana Felicianos- Ramos, Lisandra Arroyo-Ramírez, Diana C. Díaz-Cartagena, Lisandro Cunci, Nelson Rivera-Vélez and **Carlos R. Cabrera** en *ACS San Diego, California (oral), marzo 2012*.

"Electrochemical oxidation of NADH using alcohol dehydrogenase: Comparison between gold and palladium electrode", Yarimar De La Torre-Meléndez, Ileana Feliciano-Ramos, **Carlos R. Cabrera**, en *ACS San Diego, California (poster), marzo 2012*.

"Palladium Nanoparticles for Biosensor and Alkaline Fuel Cell Applications" Diana C. Díaz-Cartagena, Ileana Feliciano-Ramos, Lisandra Arroyo-Ramírez, Lisandro Cunci, Nelson Rivera-Vélez, **Carlos R. Cabrera** en *el PRISM, Carolina (poster) en marzo 2012*

"Unsupported Palladium Nanoparticles to Electrooxidation of Ethanol in Alkaline Fuel Cell", Ileana Feliciano-Ramos, Lisandra Arroyo-Ramírez, Diana C. Díaz-Cartagena, Lisandro Cunci, Nelson Rivera-Vélez, María del Mar-García, Bárbara Casañas, Ana Rita Mayol and **Carlos R. Cabrera**, en *NSF-GK-12 Meeting, WDC y en el PRISM, Carolina (poster) en marzo 2012*.

"Synthesis of Palladium Nanoparticles via Chemical Reduction for Electrooxidation of Ethanol in Alkaline Medium" Ileana Felicianos- Ramos, Diana C. Díaz-Cartagena, Lisandra Arroyo-Ramírez, Lisandro Cunci, Nelson Rivera-Vélez and **Carlos R. Cabrera** en *NASA Visit, UPR Río Piedras (poster) en enero 2012*

Lisandro Cunci, Student poster at University of Massachusetts at Amherst, "Preparation and Electrochemistry of Pt and Ir nanocatalysts on Graphene Oxide", and NSF site visit team student meeting, NSF Visit, May 2012, Massachusetts, USA.

Lisandro Cunci, Student poster at PRISM, "Preparation and Electrochemistry of Pt and Ir nanocatalysts on Graphene Oxide", UPR at Carolina Campus, March 2012, Puerto Rico.

Lisandro Cunci, Oral presentation at IUPAC 2011, "Preparation and Electrochemistry of Pt and Ir nanoparticles deposited and co-deposited on Graphene Oxide for ammonia oxidation", August 2011, San Juan, Puerto Rico.

Keyla Soto, Agosto 2011: Presentación de poster sobre el tema: *Reduction of Cd ⁺² ions at nanoscale zero valent iron for the remediation of heavy metals in wastewater* 43rd IUPAC World Chemistry Congress, 70th CQPR Annual Conference and Exhibition, July 30 to August 5, 2011, San Juan, Puerto Rico Convention Center, Document ID: IUPAC1066

Rolando Guzmán-Blas, Development of Vulcan/Pt/CeO₂ anode electrocatalyst for direct methanol fuel cell prepared with impregnation method; 43rd IUPAC World Chemistry Congress, August 04, 2011.

Rolando Guzmán-Blas, Pt/CeO₂ catalyst preparation by impregnation method for DMFC, DEFC and PEMFC; NASA-UPR-Rio Piedras, San Juan, PR; January 30, 2012.

Rolando Guzmán-Blas, Platinum Electrodeposition Using a Rotating Disk-Slurry Electrode Technique in the Presence of Conductive Polymers; NASA-UPR-Rio Piedras, San Juan, PR; January 30, 2012.

Rolando Guzmán-Blas, Pt/Ceria catalyst preparation by impregnation method for DMFC, DEFC and PEMFC; NSF Site Visit Team-UMASS-Amherst, MA; May 03, 2012.

Rolando Guzmán-Blas, Pt/Ceria catalyst preparation by impregnation method for DMFC, DEFC and PEMFC; New Diamond and Nano-Carbons Conference, San Juan, Puerto Rico, May, 2012.

Dr. Néstor M. Carballeira

Carballeira, N. M., Cartagena, M. M., Li, F., Chen, Z., Prada, C. F., Calvo-Alvarez, E., Reguera, R. M., Balaña-Fouce, R. "First Total Synthesis of the (±)-2-Methoxy-6-heptadecynoic acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", 243rd American Chemical Society National Meeting & Exposition, San Diego, California, March 25-29, 2012.

Carballeira N. M., Cartagena, M., Li, F., Chen, Z., Prada, C. F., Calvo-Alvarez, E., Reguera, R. M., and Balaña-Fouce R. "First Total Synthesis of the (±)-2-Methoxy-6-heptadecynoic Acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", 35th ACS Senior Technical Meeting, Embassy Suites Dorado del Mar, Dorado, Puerto Rico, November 3-4, 2011.

Carballeira, N. M., "Naturally Occurring Lipids as New Inspirational Motifs for Novel Antiprotozoal Compounds", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Students under N. Carballeira

Cintrón, G. A., Rosado, K., Cartagena, M. M., Orellano, E.A., Calvo-Alvarez, E., Fernández, C., Reguera, R. M., Balaña-Fouce, R., **Carballeira, N. M.** "New Synthetic Antineoplastic Δ^2 -Acetylenic

Fatty Acids", 243rd American Chemical Society National Meeting & Exposition, San Diego, California, March 25-29, 2012.

Cintrón, G., Rosado, K., Cartagena, M. M., Orellano, E. A., and **Carballeira, N. M.** "New Synthetic Antineoplastic Δ^2 -Acetylenic Fatty Acids", Annual Biomedical Research Conference for Minority Students (ABRCMS), St. Louis, Missouri, November 9-12, 2011.

Chorna, N. E., Montano, N., Pérez, A., Santos, I. J., Vázquez, A., Chorny, A. P., **Carballeira, N.**, and Peña de Ortiz, S. "Voluntary Running Enhances Saturated Free Acid Metabolism that is Essential for Spatial Learning and Memory: A Neurolipidomics Approach", Neuroscience 2011, Washington DC, November 12-16, 2011.

Dávila-Aguer, C., Rivera, J., González, A., Sánchez, A., Ruiz, J., González, J., **Carballeira, N.**, Gaskins, J., Pando, A., and Toranzos, G. "Microalgae as a Source of Biolipids in Puerto Rico", 16th International Symposium on Health-Related Water Microbiology, Rotorua, New Zealand, September 18-23, 2011.

Cintrón, G. A., **Carballeira N. M.**, and Cartagena, M. M. "New Synthetic Antiprotozoal Δ^2 -Acetylenic Fatty Acids", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Orellano, E. A., Rosado, K., Cartagena, M., and **Carballeira, N. M.** "Role of α -Methoxylated Fatty Acids in Retinoic Acid-Differentiated Human Neuroblastoma SH-SY5Y Cells", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Sanabria-Rios, D. J., Fraguera-Rios, J., Montano, N., **Carballeira, N. M.**, and Rodríguez, J. W. "Evaluation of the Antimicrobial Properties of Unsaturated Fatty Acids and their Potential as Bacterial Topoisomerase II Inhibitors", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Montano, N., **Carballeira, N. M.**, and López, R. E. "First Total Synthesis of (5Z,9Z)-18-Methyl-5,9-Nonadecadienoic Acid from the Caribbean Sponge *Pseudospongosorites suberitoides*", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Giménez Moreira, L., Orellano, E. A., and **Carballeira, N. M.** "Synthesis of New Long-Chain Unsaturated Fatty Acids as Potential HIV-1 RT Inhibitors", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Baerga-Ortiz, A., **Carballeira, N. M.**, and Oyola-Robles, D. J. "Improvement of Fatty Acid Production in *Escherichia coli* by Over-Expression of Enzymes from a Bacterial Polyunsaturated Fatty Acid Synthase", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Oyola-Robles, D. J., **Carballeira, N. M.**, and Baerga-Ortiz, A. "Dehydratase Domains and the Formation of Double Bonds in Polyunsaturated Fatty Acids Biosynthesis", 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Oyola-Robles, D. J., Rodríguez-Guilbe, M. M., Bermudez, M.-L., Rivera Diaz, M., **Carballeira, N. M.**, and Baerga-Ortiz, A. "Expression of a Tetradomain Fragment from a Polyunsaturated Fatty Acid

Synthase with Dehydratase Activity", Society for Industrial Microbiology (SIM) 2011 Annual Meeting and Exhibition, Sheraton New Orleans, New Orleans, Louisiana, July 24-28, 2011.

Marrero, W., Montano, N., and **Carballeira, N. M.** "Synthesis of the (5Z,9Z)-18-Methyl-5,9-nondecadienoic Acid from the Caribbean Sponge *Pseudospongosorites suberitoides*", 47th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 32nd Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico at Carolina, Carolina, Puerto Rico, March 10, 2012.

Cintrón, G., Orellano, E. A., Cartagena, M. M., and **Carballeira, N.M.** "Fighting Neuroblastomas with 2-Alkynoic Fatty Acids", 47th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 32nd Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico at Carolina, Carolina, Puerto Rico, March 10, 2012.

Rosado, K., Orellano, E. A., and **Carballeira, N. M.** "α-Methoxylated Fatty Acids as Anticancer Drugs", 47th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 32nd Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico at Carolina, Carolina, Puerto Rico, March 10, 2012.

Cintrón, G., Rosado, K., Cartagena, M. M., Orellano, E. A., and **Carballeira, N. M.** "New Synthetic Antineoplastic Δ²-Acetylenic Fatty Acids", 35th ACS Senior Technical Meeting, Embassy Suites Dorado del Mar, Dorado, Puerto Rico, November 3-4, 2011.

Domínguez, I., Jiménez, C., Ríos, C., López, L., **Carballeira, N. M.**, Rodríguez, J. W., and Sanabria-Ríos, D. "Synthesis and Antibacterial Properties of 2-Hexadecenoic Acid and its Potential as a Human Topoisomerase I Inhibitor", 35th ACS Senior Technical Meeting, Embassy Suites Dorado del Mar, Dorado, Puerto Rico, November 3-4, 2011.

Dr. Zhongfang Chen

July 24	2012	Summer School of Theoretical Chemistry, Nanjing University, Nanjing, China
July 23	2012	School of Chemistry, Beijing Normal University, Beijing, China
July 18	2012	Department of Physics, University of Science and Technology of China, Hefei, China
July 17	2012	Department of Chemistry, University of Science and Technology of China, Hefei, China
July 16	2012	Institute for Theoretical Chemistry, Jilun University, Changchun, China
July 10	2012	Institute of New Energy Material Chemistry, Nankai University, China
July 9	2012	Institute of New Energy Material Chemistry, Nankai University, China
June 29	2012	Institute for Metal Research, Chinese Academy of Science, Shenyang, China
June 28	2012	Department of Physics, Dalian University of Technology, Dalian, China
June 28	2012	Institute of Chemical Physics, Chinese Academy of Science, Dalian, China
June 26	2012	Department of Physics, Dalian University of Technology, Dalian, China
June 17	2012	5 th International Conference on Computational Nanoscience and New Energy Materials, Yantai, China
June 15	2012	Summer School, 5 th International Conference on Computational Nanoscience and New Energy Materials, Yantai, China
June 12	2012	Department of Physics, Fudan University, Shanghai, China
May 21	2012	2012 New Diamond and Nano Carbons Conference, San Juan, PR
Jan. 27	2012	Puerto Rico Symposium on Nanoparticles as Tools in BioSensing, BioImaging,

and Novel Treatments, Aguadilla, PR
 Sept. 8 2011 ChinaNANO 2011, keynote speaker, Beijing, China
 Sept. 6 2011 Institute for High Energy Physics, Chinese Academy of Science, Beijing, China
 Sept. 6 2011 Department of Chemistry, Beijing University of Science and Technology, Beijing, China
 Aug. 12 2011 Summer School of Physical Chemistry for Graduate Students, Guangzhou, China
 Aug. 10 2011 Institute of Textiles & Clothing, Hong Kong Polytechnic University, Hong Kong
 Aug. 2 2011 Symposium on "New Frontiers of Computational Nanomaterials Science", IUPAC, San Juan, PR

Dr. Jorge Colón

Jorge L. Colón, "Transporte de Drogas Anticáncer Mediante Nanopartículas", Colegio de Químicos de Puerto Rico, Caribbean University, Ponce, Puerto Rico, May 2012.

Jorge L. Colón, "Taller de Construcción de Celda Solar de TiO₂ Sensibilizada por Tinte", Colegio de Químicos de Puerto Rico, Convención Anual PRCHEM 2012, Rio Grande, Puerto Rico, August 2012.

Agustín Díaz, Bárbara Casañas, Millie González, Adriana Báez, Abraham Clearfield, Jorge L. Colón, "Drug Delivery using Layered Structured Nanomaterials", 2^{do} Congreso de Biotecnología, Pontificia Universidad Católica de Puerto Rico-Recinto de Arecibo, Arecibo, October 2012.

Agustín Díaz, Bárbara Casañas, Millie González, Adriana Báez, Abraham Clearfield, Jorge L. Colón, "Drug Delivery using Layered Structured Nanomaterials", Asociación de Ciencias de la Salud, In Search of Excellence Conference Series, Universidad del Sagrado Corazón, San Juan, November 2012.

Agustín Díaz, Bárbara Casañas, Millie González, Adriana Báez, Abraham Clearfield, Jorge L. Colón, "Drug Delivery using Layered Structured Nanomaterials", 36th American Chemical Society (ACS) Senior Technical Meeting PR Local Section, Ponce, PR, Oral Presentation, November 2012.

Students under J. Colón

Casañas Montes, Barbara; Ortiz, Edwin O.; Cintrón, Isatis; Motta, Noel; Cabrera, Carlos R.; **Colón, Jorge L.**, "NSF Center for Chemical Innovation Solar Army-Caribbean Brigade Workshops for Teachers and Students", CCI 2012 Annual Retreat, Huntington Beach, CA, USA, Poster Presentation, January 2012.

Francisco Martínez; Barbara Casañas; Ingrid, Montes; **Jorge L. Colón**; "Intercalation of a ferrocene derivative in zirconium phosphate layers", 2012 Junior Science and Humanities Symposium (PRJSHS), Puerto Rico, Poster Presentation, February 2012.

Ramos, Coralís; Casañas, Barbara; Barbosa, Cindy; **Colón, Jorge L.** "Intercalation of Titanocene Dichloride in the layers of Zirconium Phosphate as a Potential anticancer Drug System", 32nd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Oral Presentation, March 2012.

Núñez, Aideliz; Casañas, Barbara; Giray, Tugrul; **Colón, Jorge L.**, "Intercalation of Dopamine in Zirconium Phosphate for Potential Use as Drug Carriers", 32nd Puerto Rico Interdisciplinary Scientific

Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Oral Presentation, March 2012.

Rivera, Grisel; Casañas, Barbara; Agosto, José L.; **Colón, Jorge L.** "Intercalation of Carbamazepine in Zirconium Phosphate Layers as a Potential Drug Delivery System", 32nd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Oral Presentation, March 2012.

Collazo, Cindy; Casañas, Barbara; Ramos, Coralís; Cintrón, Isatis; Barbosa, Cindy; Meléndez, Enrique; **Colón, Jorge**, "Intercalation of Molybdocene Dichloride into Zirconium Phosphate Layers for Drug Delivery Applications", 32nd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Oral Presentation, March 2012.

Miranda Yoliem; Casañas, Bárbara; González, Julissa; **Colón, Jorge L.**, "Zirconium Phosphate Layered Material as Possible Drug Carrier to Reduce Secondary Effects of Doxorubicin Anticancer Drug Treatment", 32nd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Oral Presentation, March 2012.

Casañas Montes, Barbara; Gonzalez, Julissa; Ramos, Coralís; Collazo, Cindy; Núñez, Aideliz; Rivera, Grisel; Miranda, Yoliem; Agosto, José L.; Giray, Tugrul; Meléndez, Enrique; **Colón, Jorge L.**, "Layered inorganic nanomaterials for neurochemical and cancer therapy", 32nd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and the 47th ACS Junior Technical Meeting, Carolina, PR, Poster Presentation, March 2012.

Miranda Yoliem; Casañas, Barbara; González, Julissa; **Colón, Jorge L.**, "Zirconium Phosphate Layered Material as Possible Drug Carrier to Reduce Secondary Effects of Doxorubicin Anticancer Drug Treatment", 1^{er} Congreso Estudiantil de Investigación, Río Piedras, PR, Oral Presentation, April 2012.

Collazo, Cindy; Casañas, Barbara; Ramos, Coralís; Cintrón, Isatis; Barbosa, Cindy; Meléndez, Enrique; **Colón, Jorge**, "Intercalation of Molybdocene Dichloride into Zirconium Phosphate Layers for Drug Delivery Applications", 1^{er} Congreso Estudiantil de Investigación, Río Piedras, PR, Oral Presentation, April 2012.

Ramos, Coralís; Casañas, Barbara; Barbosa, Cindy; **Colón, Jorge L.** "Intercalation of Titanocene Dichloride in the layers of Zirconium Phosphate as a Potential anticancer Drug System", 1^{er} Congreso Estudiantil de Investigación, Río Piedras, PR, Oral Presentation, April 2012.

Rivera, Grisel; Casañas, Barbara; Agosto, José L.; **Colón, Jorge L.** "Intercalation of Carbamazepine in Zirconium Phosphate Layers as a Potential Drug Delivery System", 1^{er} Congreso Estudiantil de Investigación, Río Piedras, PR, Oral Presentation, April 2012.

Francisco Martínez; Barbara Casañas; Ingrid, Montes; **Jorge L. Colón**; "Intercalation of a ferrocene derivative in zirconium phosphate layers", Junior Science and Humanities Symposium (JSHS), Maryland, USA, Poster Presentation, May 2012.

Casañas Montes, Barbara; Díaz, Agustín; David, Amanda; Millie Gonzalez; Núñez, Aideliz; Collazo, Cindy; Ramos, Coralís; Rivera, Grisel; Gonzalez, Julissa; Miranda, Yoliem; Báez, Adriana; Meléndez, Enrique; Agosto, José L.; Giray, Tugrul; Clearfield, Abraham; **Colón, Jorge L.**, "Novel applications of inorganic zirconium phosphate layered materials", PREM-UPR-Penn Symposium of the new science of disordered materials, Humacao, PR, Poster Presentation, May 2012.

Francisco Martínez; Barbara Casañas; Ingrid, Montes; **Jorge L. Colón**; "Intercalation of a ferrocene derivative in zirconium phosphate layers", Intel International Science and Engineering Fair (ISEF), Pennsylvania, USA, Poster Presentation, May 2012.

Casañas Montes, Barbara; Barbosa, Cindy; Collazo, Cindy; Meléndez, Enrique; **Colón, Jorge L.**, "Intercalation of carbamazepine in inorganic layered nanomaterial for drug delivery application", 36th American Chemical Society (ACS) Senior Technical Meeting PR Local Section, Ponce, PR, Oral Presentation, November 2012.

Dr. Kai Griebenow

Chemical glycosylation and its impact on protein structure, function, and dynamics. October 19, 2011, Dept. of Biology, University of Puerto Rico.

Center for Renewable Energy and Sustainability. Interdisciplinary Symposium on Energy Technology, Policy and Design. April 12, 2012, UPR-RP.

Center for Renewable Energy and Sustainability. DoD Site Visit June 1, 2012, UPR-RP.

Students under K. Griebenow

Yamixa Delgado and **Kai Griebenow**. Effect of chemical glycosylation on peptides biophysical properties: a computational study, 36th FEBS Congress "Biochemistry for Tomorrow's Medicine; June 27, 2011, Centro Congressi Lingotto, Turin, Italy.

Miraida Pagan, Meyya Meyyapaan, **Kai Griebenow**, Carbon Nanofibers as Principal Support Material for the Development of Robust Electrodes for Biosensor Applications. Summer Internship Poster Presentation at NASA Ames Research Center. NASA Ames Research Center, Moffett Field, California. July 2011.

Griselle Hernández, Liz Díaz, Carlos Cabrera and **Kai Griebenow**, PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center- August 1, 2011.

Miraida Pagan, Meyya Meyyappaan, **Kai Griebenow**, Development of Lactate biosensor for monitoring the physical fitness of astronauts, 2011 International Astronautical Congress Cape Town, South Africa, October 2011.

Griselle Hernández, Liz Díaz, Carlos Cabrera and **Kai Griebenow**, PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. American Association for the Advancement of Science (AAAS), UPR Mayaguez, October 1, 2011

Griselle Hernández, Liz Díaz, Carlos Cabrera and **Kai Griebenow**. PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. NASA CANM II site visit, UPR-RP, January 30, 2012.

Miraida Pagan, Meyya Meyyappaan, **Kai Griebenow**, Development of Lactate biosensor for monitoring the physical fitness of astronauts. NASA CANM II site visit, UPR-RP, January 30, 2012.

Frances M. Acevedo, Cindy M. Figueroa, and **Kai Griebenow**. Targeted and sustained delivery of glycolysis inhibitors from PLGA nanoparticles. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina

Yamixa Delgado, Yashira Martinez and **Kai Griebenow**. Effect of chemical glycosylation on insulin biophysical properties. Puerto Rico Interdisciplinary Scientific Meeting, March 10, 2012, University of Puerto, Carolina Campus

Gladys Díaz-Vázquez, Anna M. Molina-Calzada, and **Kai Griebenow**. Modulation of biophysical properties of the model enzyme lysozyme upon chemical glycosylation. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina

Marimar Benítez, Yamaris Pacheco, **Kai Griebenow**. Protein nanoparticle modification with activated lactose for targeted drug delivery purposes. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina

Griselle Hernández, Liz Díaz, Carlos Cabrera and **Kai Griebenow**. PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. American Association for the Advancement of Science (AAAS), ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina

Alina Montagudo, Jessica Mendez, and **Kai Griebenow**. Stimulus-responsive controlled release system by covalent immobilization of an enzyme into mesoporous silica nanoparticles. ACS National Meeting, San Diego CA, March 24- 30 2012.

Moraima Morales, Myreisa Morales, and **Kai Griebenow**. Development of a novel two-step nanoprecipitation method for encapsulating proteins into biodegradable polymer nanoparticles. Chemical Biology and Novel Tools in Pharmacology, Hilton Santa Fe/Historic Plaza, Santa Fe, New Mexico, Feb.12-16, 2012.

Cindy M. Figueroa, Frances Acevedo, and **Kai Griebenow**. Sustained delivery of glycolysis inhibitors from PLGA nanoparticles. Chemical Biology and Novel Tools in Pharmacology, Hilton Santa Fe/Historic Plaza, Santa Fe, New Mexico, Feb.12-16, 2012.

Yamixa Delgado, Yashira Martinez and **Kai Griebenow**. Effect of chemical glycosylation on insulin biophysical properties. Chemical Biology and Novel Tools in Pharmacology, Feb 13, 2012, Santa Fe, New Mexico.

Dr. Yasuyuki Ishikawa

Activity and selectivity of metal-free nitrogen-doped carbon nanotube electrodes for oxygen reduction in alkaline media," Chitturi Venkateswara Rao and **Yasuyuki Ishikawa**, ACS Meeting – San Diego (2012).

Dr. Ingrid Montes

Química Verde -nuestro compromiso, nuestro futuro Universidad Jorge Tadeo Lozano, Bogotá, Colombia, November 2011.

Students under Ingrid Montes

"Green Chemistry: A New Approach for the Synthesis of Ferrocenyl Chalcones Derivatives", Juan C. Aponte-Santini and **Ingrid Montes-González**, Ph.D. 16th Annual Green Chemistry & Engineering Conference, Washington, D.C., USA, June 2012.

"Intercalation of a ferrocene derivative in zirconium phosphate layers", Francisco Martínez; Barbara Casañas; **Ingrid, Montes**; Jorge L. Colón; Intel International Science and Engineering Fair (ISEF), Pennsylvania, USA, Poster Presentation, May 2012.

"Intercalation of a ferrocene derivative in zirconium phosphate layers", Francisco Martínez; Barbara Casañas; **Ingrid, Montes**; Jorge L. Colón; Junior Science and Humanities Symposium (JSHS), Maryland, USA, Poster Presentation, May 2012.

"Heterocycles Functionalizing Ferrocenyl Chalcones Core", Juan C. Aponte-Santini, and **Ingrid Montes González**, 243rd ACS National Meeting, San Diego, CA, March 2012.

"Ferrocenyl Chalcones: A Claisen – Schmidt reaction for mono-, bis- and unsymmetrical derivatives", Myrna R. Otaño-Vega, **Ingrid Montes González**, Ph.D. 47th Junior Technical Meeting, University of Puerto Rico, Carolina Campus, Carolina Puerto Rico, March 2012.

"A Greener Approach for the Synthesis of Ferrocenyl Chalcones Derivatives", Fernando J. Correa Delgado, Juan C. Aponte-Santini, and **Ingrid Montes González** 47th Junior Technical Meeting, University of Puerto Rico, Carolina Campus, Carolina Puerto Rico, March 2012.

"Intercalation of a ferrocene derivative in zirconium phosphate layers", Francisco Martínez; Barbara Casañas; Ingrid, Montes; **Jorge L. Colón**; 2012 Junior Science and Humanities Symposium (PRJSHS), Puerto Rico, Poster Presentation, February 2012.

"Intercalation of a ferrocene derivative in zirconium phosphate layers", Francisco Martínez; Barbara Casañas; **Jorge L. Colón**; 35th American Chemical Society (ACS) Senior Technical Meeting PR Local Section, Dorado, PR, Poster Presentation, November 2011.

"Ferrocenyl Chalcones: Synthesis and Characterization of New Ferrocene Polymers" Johanna Fajardo, Janice Soto and **Ingrid Montes**, Ph.D., 35th Senior Technical Meeting, Embassy Suites Dorado Del Mar, Dorado, P.R., November 2011.

"Ferrocenyl Chalcones: Precursors for Heterocyclic Compounds", Juan C. Aponte-Santini, and **Ingrid Montes González**, 35th Senior Technical Meeting, Embassy Suites Dorado Del Mar, Dorado, P.R., November 2011.

"Ferrocenyl Chalcones as Precursors for Ferrocenyl Homopolymers", Johanna Fajardo, Janice Soto and **Ingrid Montes**, Ph.D., 35th Senior Technical Meeting, Embassy Suites Dorado Del Mar, Dorado, P.R., November 2011.

"Puerto Rico Local Section Women Chemists Committee", Rodríguez-Escudero, Idaliz; Otaño, Myrna R.; Casañas Montes, Bárbara; Fajardo, Johanna; **Montes, Ingrid**, 35th American Chemical Society (ACS) Senior Technical Meeting PR Local Section, Dorado, PR, Poster Presentation, November 2011.

"Synthesis and characterization of Ferrocenyl Chalcones: Advances to the syntheses of mono-, bis-, and unsymmetrical derivatives", Myrna R. Otaño-Vega, **Ingrid Montes González**, Ph.D. 35th Senior Technical Meeting, Embassy Suites Dorado del Mar, Dorado Puerto Rico, November 2011.

"Synthesis of ferrocenyl chalcones derivatives: Are we really "greening" it up?" Adriana Rodríguez, Myrna R. Otaño-Vega, **Ingrid Montes González**, Ph.D. 35th Senior Technical Meeting, Embassy Suites Dorado del Mar, Dorado Puerto Rico, November 2011.

"Synthesis and Characterization of New Ferrocene Polymers from Ferrocenyl Chalcones", Johanna Fajardo, Janice Soto and **Ingrid Montes**, Ph.D., 43rd IUPAC World Chemistry Congress/ 46th IUPAC General Assembly/ 70th CQPR Annual Conference and Exhibition, Conventional Center, San Juan, P.R., July 2011.

"Synthesis and Characterization of mono-, bis-, and unsymmetrical ferrocenyl chalcones", Myrna R. Otaño-Vega, **Ingrid Montes González**, Ph.D. 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan Puerto Rico, July 2011.

"New approach for the preparation of alkyl iodides", Sara M. Delgado-Rivera, **Ingrid Montes-González**, Ph.D., Francisco J. Arnáiz, Ph.D. 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center, San Juan Puerto Rico, July 2011.

"A greener approach for the synthesis of ferrocenyl chalcone derivatives", Adriana Rodríguez, Myrna R. Otaño-Vega, **Ingrid Montes González**, Ph.D. 46th Junior Technical Meeting, Interamerican University, Bayamón Campus, Bayamón Puerto Rico, March 2011.

"Ferrocenyl Chalcones as Precursors for Ferrocene Polymers", Johanna Fajardo, Janice Soto and **Ingrid Montes**, Ph.D., PRISM/ ACS 46th Jr. Technical Meeting-Interamerican University of Puerto Rico, Bayamón, PR, March 2011.

"Synthesis and Characterization of New Ferrocene Polymers from Ferrocenyl Chalcones" Johanna Fajardo, Janice Soto and **Ingrid Montes**, Ph.D., PRISM/ ACS 46th Jr. Technical Meeting-Interamerican University of Puerto Rico, Bayamón, PR, March 2011.

"Ferrocenyl Chalcones: Precursors For Heterocyclic Compounds" Juan C. Aponte-Santini, **Ingrid Montes-González**, Ph.D. 35th ACS Senior Technical Meeting, Puerto Rico, November 2011.

"Functionalization of the Ferrocenyl Chalcones Framework", Juan C. Aponte-Santini, **Ingrid Montes**, Ph. D. 43rd IUPAC World Chemistry Congress, Puerto Rico, August 2011.

Dr. José A. Prieto

Epoxide Approach for the synthesis of the C14-C25 polypropionate fragment of bafilomycin A₁", Elizabeth M. Valentín Nevárez, Marlenne Mulero and **José A. Prieto**, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

Students under José A. Prieto

The effect of the remote protecting group in the cleavage reaction of 3,4-epoxy alcohols", Luis A. Vazquez, Gabriela Fernández, Gerardo Torres and **José A. Prieto**, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

"General Epoxide-Based Methodology for the Synthesis of the Hemiacetal Rings in the Plecomacrolide Family", Elizabeth M. Valentín, Jorge A. Vargas, and **José A. Prieto**, , 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

"Epoxidation studies as the key step toward the total synthesis of (-)-pironetin", Gerardo Torres, Elizabeth Valentin and **José A. Prieto**, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

"Epoxide approach towards the Synthesis of Dolabriferol", Keyla F. Morales, Raúl Rodríguez and **José A. Prieto**, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

"The Effect of the Remote Protecting Group in the Cleavage Reaction Of 3,4-Epoxy Alcohols ", Luis A. Vazquez-Maldonado, Gerardo Torres and **José A. Prieto**, 47th Junior Technical Meeting, ACS-Puerto Rico Section, March 10, 2012, Carolina, P. R.

"Studies Towards the Synthesis of the C14–C24 Polypropionate Fragment of Formamycin", Jorge Vargas, Jaileen Rentas and **José A. Prieto**, 47th Junior Technical Meeting, ACS-Puerto Rico Section, March 10, 2012, Carolina, P. R.

Dr. Raphael Raptis

"Octanuclear, Mixed-Valent, Pyrazolato Complexes, Containing Fe_4O_4 -Cubanes", 43rd IUPAC meeting, San Juan, PR, July 31- August 5, **2011**.

Students under R. Raptis

Logesh Mathivathanan, Yiannis Sanakis, and **Raphael G. Raptis**, "Structure, reactivity and spectroscopy of new triangular Cu(II) pyrazolate clusters", 243rd National Meeting of the American Chemical Society, San Diego, CA, March 25 – 29, **2012**.

Logesh Mathivathanan, **Raphael G. Raptis**, "Structure, reactivity and spectroscopy of new triangular Cu(II) pyrazolate clusters", 32nd, Puerto Rico Interdisciplinary Scientific Meeting, UPR – Carolina, March 10, **2012**.

Logesh Mathivathanan, Yiannis Sanakis, and **Raphael G. Raptis**, "Trinuclear and hexanuclear Cu(II)-pyrazolate clusters: structure, reactivity and spectroscopy", 43rd IUPAC world chemistry congress, San Juan, Puerto Rico, July 31- August 05, **2011**.

Dr. John A. Soderquist

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, UCLA, Los Angeles, CA, April 4, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, California Institute of Technology, Pasadena, CA, April 6, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Texas A&M University, College Station, TX, April 26, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Boron in the Americas XIII, West Lafayette, IN, June 4, 2012.

Asymmetric Hydroboration via the BBDs: Would HCB Approve?, **John A. Soderquist**, Professor Herbert C. Brown Birth Centennial, West Lafayette, IN, June 7, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Boron in the Americas XIII, West Lafayette, IN, June 4, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, Latest Trends in Organic Synthesis Symposium XV, St. Catharines, ON, August 14, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, BASF Inorganics, Inc. Evans City, PA, August 22, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, University of Pittsburgh, Pittsburgh, PA, August 23, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, University of Southern California, Los Angeles, CA, September 12, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, University of Nevada, Las Vegas, Las Vegas, NV, September 14, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, Amgen South San Francisco, South San Francisco, CA, October 1, 2012.

Asymmetric Organoborane Conversions via the Amazing BBDs, **John A. Soderquist**, Invited Lecture, National University of Rosario, Rosario, Argentina, November 1, 2012.

Dr. José Rivera

"Responsive Supramolecular G-quadruplexes" Second Training School on G-Quadruplexes: Self-assembled guanosine structures and molecular electronic devices, Domaine de Sol Cress, Spa, Belgium; September 12, 2011. [Invited]

"Smart Assemblies & Other Adventures in Supramolecular Space" Institut für Chemie und Biochemie der Freien Universität Berlin, Berlin, Germany; September 16, 2011. [Invited]

"Smart Molecules" University Gardens High School, San Juan, PR; October 26, 2011. [Invited] [Outreach]

"Responsive supramolecular assemblies and their potential in biology" IFN IRG1 Research Meeting; Aguadilla, PR; January 27, 2012. [Invited]

5.5 Modificaciones al currículo para integrar temas y experiencias educativas internacionales

6. Cultura de evaluación y responsabilidad, y gestión administrativa

6.1 Mejoramiento de los recursos humanos

6.2 Contribuciones a la gestión administrativa

6.3 Avalúo de la efectividad

7. Recursos Tecnológicos de Apoyo a la Investigación, la Docencia y los Procesos Administrativos

7.1 Innovaciones y mejoras a los recursos tecnológicos

7.2 Integración de la tecnología a la investigación y la docencia

8. Infraestructura Física y Espacios Naturales

8.1 Mejoramiento de las instalaciones físicas

8.2 Acceso a las personas con impedimentos

9. Vínculos con la comunidad

9.1 Proyectos de servicio a la comunidad

El Departamento de Química se destacó por su servicio a la comunidad. Algunas de las iniciativas se detallan a continuación.

W. Adam

Member of Editorial Advisory Board, Versita Open Access Books, March 2012.

N. Carballeira

Associate Editor – *Lipids*

Editorial Advisory Board – *Chemistry and Physics of Lipids*

NIH-NIGMS Training and Workforce Development Review Subcommittee (TWD-D)

Member of the Board of Examiners of Chemists of Puerto Rico

Councilor - American Chemical Society-Puerto Rico Section

Z. Chen

(1) Evaluation of manuscripts for journals (a regular referee for over 40 international journals, over 50 manuscripts were reviewed for this period)

(2) Evaluation of research proposals for several funding agencies, including National Science Foundation (NSF), Petroleum Research Fund (PRF), and Department of Defense (DoD).

(3) Member of editorial board

Insciences-Nanotechnology

Journal of Nanoscience Letters

Journal of Materials

E-Journal of Chemistry

Communications in Computational Chemistry

Guest Co-editor, A Special Issue on Structures, Properties, and Applications of Nanomaterials: a Computational Exploration, *J. Comput. Theor. Nanosci.* 2011

(4) Member of the organizing committee of the conferences

Workshop on Computational Nanoscience and New Energy Material, Yantai, China, June, 2012

Member of Advisory Board, New Diamond and Nano Carbons Conference - San Juan, PR, May 20-24, 2012

Organizer, Symposium on "New Frontiers of Computational Nanomaterials Science", IUPAC, San Juan, PR, Aug. 2, 2011.

K. Griebenow

Re-elected to the editorial advisory board of *J. Pharm. Sci.*

Dr. José Rivera

"Smart Molecules" University Gardens High School, San Juan, PR; October 26, 2011. [Invited] [Outreach]
Board of Directors, Molecular Sciences Building of the UPR (2011/03-Present)

9.2 Actividades e iniciativas para establecer enlaces con los exalumnos

9.3 Actividades e iniciativas para obtención de fondos externos

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16. Ortiz-Quiles, E.; Soler, J.; Gobet, M.; Nosach, T.; García-Ricard, O.; Hernandez-Maldonado, A.; Greenbaum, S.; West, W.; Cabrera, C.R., "LiCl Molten Flux Synthesis of Layered-Layered Composite Li₂MnO₃- LiMO₂ (M= Mn, Ni, Co) Li-ion Battery Cathode Materials", *RCS Advances* **2014**, *4*, 12018-12027. DOI: 10.1039/C3RA47344A.
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	<p>on their surface structure", <i>J. Am. Chem. Soc.</i> 2014, <i>136</i> (4), 1280–1283. DOI: 10.1021/ja411939d.</p> <p>18. Díaz Ayala, R.; Arroyo-Ramírez, L.; Raptis, RG, Cabrera, CR, "Thermal and Surface Analysis of Palladium Pyrazolate Molecular Precursors", <i>Journal of Thermal Analysis and Calorimetry</i>, 2014, <i>115</i>(1), pp 479-488.</p> <p>19. Yu Jing, Zhen Zhou, Carlos Raul Cabrera and Zhongfang Chen, Graphene, Inorganic Graphene Analogs and Their Composites for Lithium Ion Batteries, <i>J. Mater. Chem. A</i>, 2014, Accepted Manuscript. DOI: 10.1039/C4TA01033G</p> <p>20. Roberto A. Martínez-Rodríguez, Francisco J Vidal-Iglesias, José Solla-Gullón, Carlos R Cabrera, Juan M Feliu, "Synthesis and Electrocatalytic Properties of H₂SO₄-Induced (100) Pt Nanoparticles Prepared in Water-in-Oil Microemulsion", <i>ChemPhysChem</i>, 2014, in press.</p> <p>21. Corchado, J.; Cabrera, C.R., "Ethylene Glycol Oxidation at Pt/TiO₂/Carbon Hybrid Catalysts Modified Glassy Carbon Electrodes in Alkaline Media", <i>Electrocatalysis</i>, 2014, in press. DOI: 10.1007/s12678-014-0207-0</p>
Edwin Quiñones	
Ingrid Montes	<p>Myrna Otaño, Kennett Rivero and Ingrid Montes "(E)-1-Ferrocenyl-3-(2-methoxyphenyl)prop-2-en-1-one" <i>Acta Cryst.</i>, 2014, E70, m108–m109.</p>
Jorge Colón	<p>"Direct Intercalation of Cisplatin into Zirconium Phosphate Nanoplatelets for Potential Cancer Nanotherapy", Agustín Díaz, Riviam J. Pérez, Amanda David, Millie L. González, Adriana Báez Tiffany B. Kinnibrugh, Paul Zhang, Abraham Clearfield, and Jorge L. Colón, <i>Nanoscale</i> 2013, <i>5</i>, 11456-11463.</p>
José M. Rivera	<p>Rivera, J. M.; Silva-Brenes, D. "A Photoresponsive Supramolecular G-Quadruplex" <i>Org. Lett.</i> 15, 2350–2353 (2013).</p> <p>Martín-Hidalgo, M.; García-Arriaga, M.; González, F.; Rivera, J. M. "Tuning supramolecular G-quadruplexes with mono- and divalent cations" <i>Supramol. Chem.</i> 26, [Epub ahead of print] (2014). DOI:10.1080/10610278.2014.924626</p>
John Soderquist	<p>Soderquist, John; Gonzalez, Javier "(E)-2-Boryl-1,3-dienes from the 10-TMS-9-BBDs: Highly Selective Reagents for the Asymmetric Synthesis of anti-α,β-Disubstituted-β-allenylamines from the Allylboration of Aldimines", <i>Organic Letters</i>, <i>in press</i> 2014.</p>
Lillian Bird	

Néstor Carballeira	<p>I. J. Santos-Soto, N. Chorna, N. M. Carballeira, J. G. Vélez-Bartolomei, A. T. Méndez, A. Chorny, and S. Peña de Ortiz "Voluntary Running in Young Adult Mice Reduces Anxiety-Like Behavior and Increases the Accumulation of Bioactive Lipids in the Cerebral Cortex", PLoS One, 8(12): e81459 (2013).</p> <p>N. M. Carballeira, N. Montano, R. Álvarez-Velilla, C. F. Prada, R. M. Reguera, and R. Balaña-Fouce "Synthesis of Marine α-Methoxylated Fatty Acid Analogs that Effectively Inhibit the Topoisomerase IB from <i>Leishmania donovani</i> with a Mechanism Different from that of Camptothecin", Mar. Drugs, 11, 3661-3675 (2013).</p> <p>N. E. Chorna, I. J. Santos-Soto, N. M. Carballeira, J. L. Morales, J. de la Nuez, A. Cálata-Valentín, A. P. Chorny, A. Vázquez-Montes, and S. Peña de Ortiz "Fatty Acid Synthase as a Factor Required for Exercise-Induced Cognitive Enhancement and Dentate Gyrus Cellular Proliferation", PLoS One, 8(11): e77845 (2013).</p> <p>N. M. Carballeira "Recent Developments in the Antiprotozoal and Anticancer Activities of the 2-Alkynoic Fatty Acids", Chem. Phys. Lipids, 172-173, 58-66 (2013).</p> <p>D. Oyola-Robles, D. C. Gay, U. Trujillo, J. M. Sánchez-Parés, M. L. Bermúdez, M. Rivera-Díaz, N. M. Carballeira, and A. Baerga-Ortiz "Identification of Novel Protein Domains Required for the Expression of an Active Dehydratase Fragment from a Polyunsaturated Fatty Acid Synthase", Protein Sci., 22, 954-963 (2013).</p> <p>E. A. Orellano, M. M. Cartagena, K. Rosado, and N. M. Carballeira "Synthesis of the Novel (\pm)-2-Methoxy-6-icosynoic Acid – a Fatty Acid that Induces Death of Neuroblastoma Cells", Chem. Phys. Lipids, 172-173, 14-19 (2013). (<i>this publication was featured in the Global Medical Discovery Series</i>).</p> <p>D. J. Sanabria-Ríos, Y. Rivera-Torres, G. Maldonado-Domínguez, I. Domínguez, C. Ríos, D. Díaz, J. W. Rodríguez, J. S. Altieri-Rivera, E. Ríos-Olivares, G. Cintrón, N. Montano, and N. M. Carballeira "Antibacterial Activity of 2-Alkynoic Fatty Acids Against Multidrug Resistant Bacteria", Chem. Phys. Lipids, 178, 84-91 (2014).</p> <p>D. Oyola-Robles, C. Rullán Lind, N. M. Carballeira, and A. Baerga Ortiz "Expression of Dehydratase Domains from a Polyunsaturated Fatty Acid Synthase Increases the Production of Fatty Acids in <i>Escherichia coli</i>", Enzyme Microb. Tech., 55, 133-139 (2014).</p>
Noel Motta	
Rosa Betancourt	
Liz Díaz	
Rosa Flores	

Zhongfang Chen	
Carlos Torres	
Francisco Echegaray	
José A. Prieto	"Regiocontrolled Ring Opening of Monoprotected 2,3-Epoxy-1,4-Diols by Using Alkynyl Aluminum Reagents: Synthesis of Differentially Monoprotected Alkynyl Triol Derivatives" J. A. Prieto,* J. Rentas Torres, R. Rodriguez-Berrios, <i>Synlett</i> 2014 , 25, 433-437 (doi: 10.1055/s-0033-1340332).
Kai Griebenow	<p>Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. <i>Mol. Pharm.</i> 11(1):102-11. PMCID: PMC390532.</p> <p>Yamixa Delgado, Moraima Morales-Cruz, José Hernández-Román, Yashira Martínez and Kai Griebenow (2014) Chemical glycosylation of cytochrome c improves physical and chemical protein stability. <i>BMC Biochemistry</i>, in press.</p> <p>Nicolau E, Fonseca, JF, Rodriguez Martinez JA, Richardson T-M, Flynn M, Griebenow K, Cabrera CR (2014) Evaluation of a urea bioelectrochemical system for wastewater treatment processes. <i>ACS Sustainable Chem. & Eng.</i> 2(4): 749-754.</p> <p>Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. <i>Mol. Pharm.</i> 11(1):102-11. PMCID: PMC390532</p>
Dalice Piñero	Switching off the SMM properties of the [(Co(Me6TREN)(OH ₂)) ₂ + module by complexation with [RuIII(salen)(CN) ₂]-, New Journal of Chemistry, Advanced Article. Submitted for publication.

Dr. Jorge L. Colón

List of publications (July 2014 - June 2015)

Books coauthored

1. *Tailored Organic-Inorganic Materials*, Brunet, E.; **Colón, J. L.**; Clearfield, A. Eds. Wiley: Hoboken, 2015.

Chapters authored

1. "Drug Carriers Based on Zirconium Phosphates Nanoparticles", **Colón, J. L.**; Casañas, B. in *Tailored Organic-Inorganic Materials*, Brunet, E.; Colón, J. L.; Clearfield, A. Eds. Wiley: Hoboken, 2015.

Papers

1. Casañas-Montes, B.; Díaz, A.; Barbosa, C.; Ramos, C.; Collazo, C.; Meléndez, E.; Queffelec, C.; Fayon, F.; Clearfield, A.; Bujoli, B.; Colón, J.L. Molybdocene dichloride intercalation into zirconium phosphate nanoparticles. *J. Organometal. Chem.* 2015, 791, 34-40.
2. González, M.L.; Ortiz, M.; Hernández, C.; Cabán, J.; Rodríguez, A.; Colón, J.L.; Báez, A. Zirconium Phosphate Nanoplatelet Potential for Anticancer Drug Delivery Applications", *J. Nanosci. Nanotech.* 2015, in press.

List of presentations by your students (July 2014 - June 2015):

1. Casañas, Barbara; **Colón, Jorge L.** RISE Program Seminar. *Chateaubriand fellowship experience & Metallocene dichlorides intercalation into zirconium phosphate for potential cancer nanotherapy* (coauthor). Oral presentation. University of Puerto Rico-Río Piedras, San Juan, PR, Sep 12, 2014.
2. Casañas-Montes, Barbara; Díaz, Agustín; Barbosa, Cindy; Ramos, Coralís; Meléndez, Enrique; Queffelec, Clémence; Fayon, Franck; Clearfield, Abraham; Bujoli, Bruno; **Colón, Jorge L.** 38th American Chemical Society (ACS) Senior Technical Meeting, Puerto Rico Local Section. *Metallocene dichlorides intercalation in inorganic layered nanomaterial for potential cancer nanotherapy* (coauthor). Oral Presentation, Sheraton Hotel Old San Juan, San Juan, PR, Nov 7, 2014.
3. González, Julissa; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; **Colón, Jorge L.** 38th American Chemical Society (ACS) Senior Technical Meeting, Puerto Rico Local Section. *Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles* (coauthor). Poster presentation, Sheraton Hotel Old San Juan, San Juan, PR, Nov 7, 2014..
4. Casañas Montes, Barbara; Ortiz, Edwin O.; Motta, Noel; Cabrera, Carlos R.; **Colón, Jorge L.** NSF Center for Chemical Innovation 2015 Annual Retreat. *CCI Solar Army-Caribbean Brigade Workshops for teachers and students* (coauthor), Newport Beach, CA, Poster Presentation, Jan 23-25, 2015.
5. Casañas-Montes, Barbara; Díaz, Agustín; Barbosa, Cindy; Ramos, Coralís; Meléndez, Enrique; Queffelec, Clémence; Fayon, Franck; Clearfield, Abraham; Bujoli, Bruno; **Colón, Jorge L.** 2015 American Association for the Advancement of

- Science (AAAS) Annual Meeting. *Inorganic Layered Nanomaterial for Potential Cancer Therapy* (coauthor). San José, CA, Poster Presentation, Feb 12-16, 2015.
6. González, Julissa; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; **Colón, Jorge L.** 2015 American Association for the Advancement of Science (AAAS) Annual Meeting. *Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles* (coauthor). San José, CA, Poster Presentation, Feb 12-16, 2015.
 7. Ramos, Mario; González, Julissa; **Colón, Jorge L.** 50th American Chemical Society (ACS) Junior Technical Meeting/PRISM 2015. *Cointercalation of Doxorubicin and Cisplatin in Zirconium Phosphate Nano-platelets as a Delivery Agent for Combination Chemotherapy* (coauthor). University of Puerto Rico-Río Piedras Campus, Oral Presentation. March 15, 2015.
 8. Torres, Bianca M.; Casañas Montes, Barbara; **Colón, Jorge L.** 50th American Chemical Society (ACS) Junior Technical Meeting/PRISM 2015. *Chemical characterization of ferrocene derivatives and their intercalation into zirconium phosphate layers for potential use as redox mediators in biosensors* (coauthor). University of Puerto Rico- Río Piedras Campus, March 15, 2015.
 9. González, Julissa; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; **Colón, Jorge L.** 50th American Chemical Society (ACS) Junior Technical Meeting/PRISM 2015. *Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles* (coauthor). University of Puerto Rico- Río Piedras Campus, Oral Presentation. March 15, 2015.
 10. Vera Rosado, Adelfa; Casañas Montes, Barbara; **Colón, Jorge L.** 50th American Chemical Society (ACS) Junior Technical Meeting/PRISM 2015. *Intercalation and Characterization of Ferrocene Derivatives in Zirconium Phosphate Layers by Direct Ion Exchange* (coauthor). University of Puerto Rico-Río Piedras Campus, Oral Presentation. March 2015.
 11. González, Julissa; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; **Colón, Jorge L.** 1st Graduate Research Conference. *Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles* (coauthor). University of Puerto Rico- Río Piedras Campus, Poster Presentation. San Juan, PR, April 8-9, 2015.

List of your presentations (July 2014 - June 2015):

- 1.. Science for Haiti: International collaborations to advance Haitian science and science education capacity and innovation, Jorge L. Colón, Innovation from International Collaborations Symposium, 248th American Chemical Society (ACS) National Meeting, San Francisco, California, Aug 10-14, 2014.
2. **(Invited)** “La Brigada Caribeña del Ejército Solar: Compromiso Científico Boricua Ante la Crisis Energética y el Cambio Climático”, Jorge L. Colón, 1er Simiposio de Química: Química Analítica y Química Ambiental-Verde, Universidad de Puerto Rico-Aguadilla, November 20, 2014.
3. **(Invited)** Artificial Photosynthesis, Biosensors, and Drug Delivery Using Layered Structured Nanomaterials, Jorge L. Colón, RISE Program Seminar, University of Puerto Rico-Humacao, April 14, 2015.
4. **(Invited)** The Caribbean Brigade of the CCI Solar Army, Jorge L. Colón, NSF Site Visit to Center for Chemical Innovation, Pasadena, California, May 13-15, 2015.
5. **(Invited)** Artificial Photosynthesis, Biosensors, and Drug Delivery Using Layered Structured Nanomaterials, Jorge L. Colón, Instituto Universitario de Electroquímica, University of Alicante, Alicante, Spain, June 19, 2015.

List of your Natural Sciences collaborators during July 2014 - June 2015:

1. Ingrid Montes
2. Ana R. Guadalupe
3. Carlos Cabrera
4. Arthur Tinoco
5. José Luis Agosto
6. Tugrul Giray

Academic achievements and distinctions for the period July 2014 - June 2015:

1. Member of the American Chemical Society International Activities Committee.
2. Elected Treasurer of the American Chemical Society-Puerto Rico Section.
3. Elected Alternate Councilor of the American Chemical Society-Puerto Rico Section.
4. Treasurer of the American Association for the Advancement of Science-Caribbean Division.
5. President of the Sciences and Technology Committee of the "Colegio de Químicos de Puerto Rico".
6. Member of the International Union of Pure and Applied Chemistry (IUPAC) Committee of the "Colegio de Químicos de Puerto Rico".

Dra. Rosa Betancourt-Pérez

"Manual de Aprendizaje Activo, Parte 1", Octava Edición, 2015. Rosa Betancourt-Pérez

Dr. José Rivera

A. My presentations:

1. "Encapsulation and Delivery of Therapeutic Agents by Nano- and Microglobules Formed by Responsive Supramolecular G-quadruplexes" Gordon Research Conference on Drug Carriers in Medicine & Biology, Waterville Valley Resort in Waterville Valley, NH, USA; August 17-22, 2014.
2. "Supramolecular Hacky Sacks for Nanomedicine" University of Puerto Rico, Medical Sciences Campus, San Juan, Puerto Rico; October 28, 2014.
3. "How to train your dragon (immune system) with nanomedicine: Supramolecular Assemblies of Guanosine Derivatives and their Biological Interactions" Molecular Sciences & Research Center, University of Puerto Rico, San Juan, Puerto Rico; February 26, 2015.

4. "Supramolecular Hacky Sacks for Nanomedicine: Encapsulation Nanoparticles Formed Supramolecular G-quadruplexes" University of Puerto Rico, Mayagüez, Puerto Rico; March 27, 2014.

5. "Encapsulation and Delivery of Therapeutic Agents by Nanoparticles Formed Supramolecular G-quadruplexes" 5th International Meeting on Quadruplex Nucleic Acids: G4thering; May 26-28, 2015; Bordeaux, France; May 26-28, 2015.

B. Student presentations:

Luxène, Belfleur; Diómedes, Dieppa Matos; Luis, M. Negrón; Ph.D; Oliva, M. Primera-Pedrozo, Ph.D; José, M. Rivera; Ph.D. Junior Technical meeting. Raman spectroscopic characterization of the self-assembly of guanosine derivatives. San Juan, PR. Sept. 20, 2014

Prieto Costas, Luis A.; Rodríguez, Yanira; Rivera, Jose M., Ph. D. 29th annual meeting of the AAAS Caribbean Meeting. Initial Studies Towards Sugar-Responsive Supramolecular G-Quadruplexes. Caguas, P.R. Sept. 20, 2014

Prieto Costas, Luis A.; Rodríguez, Yanira; Rivera, Jose M., Ph. D. 50th Junior Technical Meeting. Synthesis and Self-assembly Studies of Sugar-containing Guanosine Derivatives. San Juan, P.R. March 14, 2015

Rodríguez-Benítez, Attabey; Rivera-Sánchez, Maria del C. MS.; and Rivera, José M. Ph.D ACS Junior Technical Meeting. Synthesis and Self-Assembly Studies of an 8-para-Acethylphenyl-2'-Deoxyguanosine Derivative and its interactions with G-Quadruplex DNA. San Juan, PR; March 14, 2015

Rodríguez, Yanira; Prieto, Luis A.; Rivera, José M., Ph.D. Annual Biomedical Research Conference for Minority Students (ABRCMS). Synthesis and Self-Assembly Studies of Sugar-Responsive Supramolecular G-Quadruplexes. San Antonio, Texas, U.S.A. November 2014

Rodríguez, Yanira; Prieto, Luis A.; Rivera, José M., Ph.D. Puerto Rico Interdisciplinary Scientific Meeting (PRISM) and Junior Technical Meeting (JTM). Design and Synthesis of Sugar-Responsive Supramolecular G-Quadruplexes. University of Puerto Rico, Río Piedras, San Juan, PR; March 14, 2015

Dieppa, Diómedes; Negrón, Luis; Díaz, Tanya; Prieto, Luis; Rivera, José M.; Annual Biomedical Research Conference for Minority Students (ABRCMS). Encapsulation Studies of Polysaccharides and Proteins in Supramolecular Hacky Sacks. San Antonio, Texas, U.S.A. November 2014

Dieppa, Diómedes; Negrón, Luis; Díaz, Tanya; Ortiz, Edwin; Madera, Bismark; Rivera, José M.; Junior Technical Meeting. Organic Nanoflowers Constructed Via Nanogel-

Templated Crystallization of Polymers and Proteins. Río Piedras, Puerto Rico; March 14, 2015

Negrón, Frances; Díaz, Tanya; Rivera, José M., Ph.D. Junior Technical Meeting-Puerto Rico Interdisciplinary Scientific Meeting (JTM-PRISM). Studies of the Immunomodulatory Activity Using a Library of 8-Aryl-2'-Deoxyguanosine Derivatives (co-author). San Juan, Puerto Rico, U.S.A. March 14, 2015

Acosta-Santiago, Maxier; Rivera, Jose M., Ph.D., 2015 Puerto Rico Interdisciplinary Scientific Meeting. Elucidating Binding Interaction of 8-Arylguanosine Derivatives with Toll Like Receptors 7 and 8 by Computational Docking Experiments. San Juan, Puerto Rico, U.S.A. March 14, 2015

Rivera-Sánchez, María del C.; Rodriguez-Benítez, Attabey; Rivera, José M., Ph.D. 35th Puerto Rico Interdisciplinary Scientific Meeting and 50th ACS Junior Technical Meeting. Hydrophilic 8-aryl-2'-deoxyguanosine derivatives as self-assembled ligands for G-quadruplex DNA recognition. San Juan, P.R., U.S.A. March 14, 2015

Dra. Vilmalí López-Mejías

List of publications (July 2014 - June 2015)

López-Mejías, V., Matzger, A.J., Structure–Polymorphism Study of Fenamates: Toward Developing an Understanding of the Polymorphophore, Crystal Growth & Design, 2015, ASAP on web.

List of presentations by your students (July 2014 - June 2015):

None

List of your presentations (July 2014 - June 2015):

Design, Applications and Mechanistic Studies of Crystallizations on Surfaces, Vilmalí López-Mejías, University of Puerto Rico, Mayaguez Campus, Mayaguez, PR, October 30, 2014.

List of your Natural Sciences collaborators during July 2014 - June 2015:

None

Academic achievements and distinctions for the period July 2014 - June 2015:

Certificado de Educación a Distancia y Diseño Instruccional received from the Centro para Excelencia Academica for the development of an online course for QUIM 3001: Quimica General I in the Moodle Platform.

Acceptance of the PI and two undergraduate students to participate of the New York University's Materials Science and Engineering Research Center's Faculty-Student Team Program for the Summer 2015.

Dr. Zhongfang Chen

List of publications (July 2014 - June 2015)

A. Reviews articles (4)

4 A Four Decades of Planar Hypercoordinate Chemistry

Li-Ming Yang,* Eric Ganz, Zhongfang Chen,* Zhi-Xiang Wang, Paul von Ragué Schleyer

Angew. Chem. Int. Ed. 2015, accepted

3 Magnetic Properties of Atomic Clusters and Endohedral Metallofullerenes

Jijun Zhao,* Xiaoming Huang, Peng Jin, Zhongfang Chen*

Coord. Chem. Rev. 2015, accepted

2 Graphene, Inorganic Graphene Analogs and Their Composites for Lithium Ion Batteries

Yu Jing, Zhen Zhou,* Carlos R. Cabrera, Zhongfang Chen*

J. Mater. Chem. A. 2014, 2, 12104-12122.

Highlighted as a cover picture

1 Carbon Atoms Trapped in Cages: Metal Carbide Clusterfullerenes

Peng Jin*, Chengchun Tang, Zhongfang Chen*

Coord. Chem. Rev. 2014, 270-271, 89-111.

B. Book chapters (3)

3. Chemical Functionalization of Endohedral Metallofullerenes: Changes Caused from the Outside

Peng Jin*, Chengchun Tang, Zhongfang Chen*

Book chapter in Chemical Functionalization of Carbon Nanomaterials: Chemistry and Applications

Ed. Vijay Kumar Thakur, Taylor & Francis, 2014

2. Carbon Based Nanomaterials for H₂ Storage

Fen Li, Jijun Zhao, Zhongfang Chen*

Book chapter in Carbon Nanomaterials for Advanced Energy Systems

Eds. Jong-Beom Baek, Liming Dai, Wen Lu, John Wiley and Sons, Inc. 2014

1. Chemistry of Boron Nitride Nanosheets

Yunlong Liao, Zhongfang Chen,* John W. Connell, Yi Lin

Book chapter in NANOTUBES AND NANOSHEETS Functionalization and Applications

Ed. Ying Ian Chen, CRC Press 2014

C. Publications in Peer-Reviewed Journals (17)

188. Two-Dimensional Iron-Phthalocyanine (Fe-Pc) Monolayer As a Promising Single-Atom-Catalyst for Oxygen Reduction Reaction: A Computational Study

Yu Wang, Yafei Li,* Zhongfang Chen*

Nanoscale, 2015, DOI: 10.1039/C5NR00302D

187. Dynamic Motion of Lu Pair inside C76(Td) Cage

Juanyuan Hao, Fengyu Li, Hongjiang Li, Xiaoyu Chen, Yuyan Zhang, Zhongfang Chen, Ce Hao*

RSC Advance, 2015, 5, 34383-34389.

186. Selectivity Trend of Gas Separation through Nanoporous Graphene

Hongjun Liu, Zhongfang Chen, Sheng Dai, De-en Jiang

J. Solid State Chem. 2015, 224, 2-6.

185. Computational investigation on the endohedral borofullerenes M@B40 (M = Sc, Y, La)

Peng Jin*, Jianhua Hou, Chengchun Tang, Zhongfang Chen*

Theor. Chem. Acc. 2015, 134, 13.

184. Atomically Thin Arsenene and Antimonene: Semimetal-Semiconductor and Indirect-Direct Band Gap Transitions

Shengli Zhang, Zhong Yan, Yafei Li, Zhongfang Chen*, Haibo Zeng*

Angew. Chem. Int. Ed. 2015, 54, 3112-3115.

Highlighted by

Nature 2015, 517, 246:

<http://www.nature.com/nature/journal/v517/n7534/pdf/517246c.pdf>

NanoWerk:

<http://www.nanowerk.com/spotlight/spotid=38681.php>

ChemistryViews:

http://www.chemistryviews.org/details/ezone/7241602/As_and_Sb_Monolayers_as_2D_Semiconductors.html

MaterialsViews:

<http://www.materialsviewschina.com/2015/01/15239/>

183. Exploration of High-Performance Single-Atom Catalysts on Support M1/FeOx for CO Oxidation via Computational Study

Fengyu Li, Yafei Li, Xiao Cheng Zeng*, Zhongfang Chen*

ACS Catalysis, 2015, 5, 544-552.

Highlighted as a cover picture

182. Mechanical properties and stabilities of g-ZnS monolayers

Liang Han, Qing Peng, Chen Huang, Xiaodong Wen, Sheng Liu, Zhongfang Chen, Jie Lian, Suvranu De

RSC Advances, 2015, 5, 11240 – 11247.

181. Mechanical Properties and Stabilities of □-Boron Monolayers

Qing Peng,* Liang Han, Xiaodong Wen, Sheng Liu, Zhongfang Chen, Jie Lian, and Suvranu De

Phys. Chem. Chem. Phys. 2015, 17, 2160-2168.

180. Design of Three-shell Icosahedral Matryoshka Clusters A@B12@A20 (A=Sn, Pb; B=Mg, Zn, Cd, Mn)

Xiaoming Huang, Jijun Zhao,* Yan Su, Zhongfang Chen, R. Bruce King
 Scientific Reports 2014, 4, 6915.

179. Reducing Band Gap and Enhancing Carrier Mobility of Boron Nitride Nanoribbons by Conjugated π Edge States
 Yu Wang, Yafei Li,* Zhongfang Chen*
 J. Phys. Chem. C. 2014, 118, 25051–25056.

178. Layer-by-Layer Hybrids of MoS₂ and Reduced Graphene Oxide for Lithium Ion Batteries
 Yu Jing, Edwin O. Ortiz-Quiles, Carlos R. Cabrera,* Zhongfang Chen*, Zhen Zhou*
 Electrochimica Acta, 2014, 147, 392-400.

177. Theoretical Design of MoO₃-Based High-Rate Lithium Ion Battery Electrodes: The Effect of Dimensionality Reduction
 Fengyu Li, Carlos R. Cabrera, Zhongfang Chen*
 J. Mater. Chem. A. 2014, 2, 19180-19188.
 Highlighted as a cover picture

176. Metallic BSi₃ Silicene: A Promising High Capacity Anode Material for Lithium-Ion Batteries
 Xin Tan, Zhongfang Chen*
 J. Phys. Chem. C. 2014, 118, 25836–25843

175. Metallic BSi₃ Silicene and Its One-Dimensional Derivatives: Unusual Nanomaterials with Planar Aromatic D_{6h} Six-Membered Silicon Rings
 Xin Tan, Fengyu Li, Zhongfang Chen*
 J. Phys. Chem. C. 2014, 118, 25825-25835.
 Highlighted as a cover picture

174. Versatile Electronic Properties of VSe₂ Bulk, Few-Layers, Monolayer, Nanoribbons, and Nanotubes: A Computational Exploration
 Fengyu Li, Kaixiong Tu, Zhongfang Chen*
 J. Phys. Chem. C. 2014, 118, 21264–21274.

173. Scalable Holey Graphene Synthesis and Dense Electrode Fabrication Toward High Performance Ultracapacitors
 Xiaogang Han, Michael R. Funk, Fei Shen, Yu-Chen Chen, Yuanyuan Li, Caroline J. Campbell, Jiaqi Dai, Jae-Woo Kim, Yunlong Liao, John W. Connell, Veronica Barone, Zhongfang Chen, Yi Lin,* and Liangbing Hu*
 ACS Nano, 2014, 8, 8255-65.

172. Al₂C Monolayer: The Planar Tetracoordinate Carbon Global Minimum
 Yafei Li, Yunlong Liao, Paul v. R. Schleyer, Zhongfang Chen*
 Nanoscale, 2014, 6, 10784-10791.

171. Why the Photocatalytic Activity of Mo-doped BiVO₄ Is Enhanced: a Comprehensive Density Functional Study
 Kaining Ding,* Bin Chen, Zhenxing Fang, Yongfan Zhang, Zhongfang Chen
 PCCP, 2014, 16, 3465-76.

170. Be₂C Monolayer with Quasi-Planar Hexacoordinate Carbons: A Global Minimum Structure
 Yafei Li,* Yunlong Liao, Zhongfang Chen*
 Angew. Chem. Int. Ed. 2014, 53, 7248 –7252.
 Highlighted as a cover picture

169. Tuning Band Gaps of BN Nanosheets and Nanoribbons via Interfacial Dihalogen Bonding and External Electric Field
Qing Tang, Jie Bao, Yafei Li, Zhen Zhou*, Zhongfang Chen*
Nanoscale 2014, 6, 8624-8634.
Highlighted as a cover picture
168. Chemical Sharpening, Shortening, and Unzipping of Boron Nitride Nanotubes, Yunlong Liao, Zhongfang Chen*, John W. Connell*, Catharine C. Fay, Cheol Park, Jae-Woo Kim, and Yi Lin*
Adv. Funct. Mater. 2014, 24, 4497-4506.
Highlighted as a cover picture
Highlighted by <http://www.nanowerk.com/spotlight/spotid=36915.php>
Highlighted by Frost & Sullivan's Nanotech Alert
167. Comparative Density Functional Theory Study on the Electronic and Optical Properties of BiMO₄ (M= V, Nb, Ta)
Kaining Ding, Bin Chen, Yulu Li, Yongfan Zhanga, and Zhongfang Chen
J. Mater. Chem. A, 2014, 2, 8294-8303.
166. With the Same Clar Formulas, Do the Two-dimensional Sandwich Nanostructures X-Cr-X (X=C₄H, NC₃ and BC₃) Behave Similarly?
Xin Tan, Peng Jin, Zhongfang Chen*
Phys. Chem. Chem. Phys., 2014, 16, 6002-6011.
165. Self-modulated Band Structure Engineering in C₄F Nanosheets: First-Principles Insights
Yafei Li,* Bay Allen Pantoja, Zhongfang Chen*
J. Chem. Theory Comput. 2014, 10, 1265-1271.
Highlighted as a cover picture.
164. Tuning Electronic Properties of Germanane Layers by External Electric Field and Biaxial Tensile Strain: A Computational Study
Yafei Li,* Zhongfang Chen*
J. Phys. Chem. C, 2014, 118, 1148-1154.
163. Synthetic and structural study on some new porphyrin or metalloporphyrin macrocycle-containing model complexes for the active site of [FeFe]-hydrogenases
Li-Cheng Song,* Liang-Xing Wang, Chang-Gong Li, Fengyu Li, Zhongfang Chen*
J. Organomet. Chem. 2014, 749, 120-128.
162. Computational Quest for Spherical C₁₂B₆H₈ Fullerenes with "Magic" π -electrons and Quasi-planar Tetra-coordinated Carbon
Fengyu Li, De-en Jiang, Zhongfang Chen*
J. Mol. Mod. 2014, 20, 2085.

List of presentations by your students (July 2014 - June 2015):

Mr. Yunlong Liao, "Theoretical Design of MoO₃-based Nanodevices and High-rate Lithium Ion Battery Electrodes" at the 249th American Chemical Society National Meeting, Mar. 22-26, 2015, Denver, CO.

Mr. Yunlong Liao, "Tackling the Inertness of Boron Nitride Nanotubes and Nanosheets" Presentation in Physics Department seminar, April 28, 2015.

Mr. Kaixiong Tu, "A computational investigation on SnS₂ nanoribbon as potential anode materials for lithium ion battery" in 249th ACS National Meeting and Exposition, March, 2015, Denver, Colorado.

Mr. Kaixiong Tu, "Lithium Adsorption and Diffusion in SnS₂ Bulk, Bilayer, Monolayer and Nanoribbon: A Computational Investigation" in EPSCoR IFN 2014 Annual Meeting, Nov. 2014, Caguas, Puerto Rico. (poster)

Ms. Fengyu Li, "Theoretical Design of MoO₃-based Nanodevices and High-rate Lithium Ion Battery Electrodes" at Workshop on Multifunctional Nanomaterials (WMN), Jan. 15, 2015.

Ms. Fengyu Li, "Exploration of High-Performance Single-Atom Catalysts on Support M₁/FeO_x for CO Oxidation via Computational Study" in EPSCoR IFN 2014 Annual Meeting, Nov. 7, 2014, Caguas, Puerto Rico.

Miss Jessica Gonzalez, undergraduate student, "Ti@C_n (n=20,24,26,28) Endohedral Metallofullerene Reactivity", May 6th, 2015, Activity/Place: RISE Undergraduate Research Seminar - Natural Sciences, UPRR

List of your presentations (July 2014 - June 2015):

May 26 2015 College of Chemistry, Nanjing Normal University, Nanjing, China
May 19 2015 School of Environmental Science, Dalian University of Technology, Dalian, China
May 18 2015 Department of Chemistry, Dalian University of Technology, Panjin, China

July 3 2014 Department of Chemistry, Dalian University of Technology, Panjin, China
July 1 2014 Department of Physics, Dalian University of Technology, Dalian, China
June 23 2014 The 5th International Symposium on Structure-Property Relationship in Solid State Materials, keynote speaker, Qingdao, China
June 21 2014 The 7th International Conference on Computational Nanoscience and New Energy Materials, Nanjing, China
July 18 2014 College of Materials Science and Engineering, Nanjing University of Science & Technology, Nanjing, China

List of your Natural Sciences collaborators during July 2014 - June 2015:

Professor Carlos Cabrera

Academic achievements and distinctions for the period July 2014 - June 2015:

2012-2017 National Distinguished Overseas Expert, The 111 Plan of Attracting Talents, China

2015-2018 "Haitian Scholar" and "Visiting Professor", Dalian University of Technology, Panjin, China

Others

Co-organizer of the Conference on Computational Nanoscience and New Energy Materials, Nanjing, China, 2014

Dr. Eduardo Nicolau

List of publications (July 2014 - June 2015)

1. E. Nicolau, "Evaluation of nanoparticle-interfaced cellulose nanocrystal constructs as forward osmosis membranes" Journal Name., 201_, 2 (4), pp 749–754. In preparation

List of presentations by your students (July 2014 - June 2015):

1. "Synthesis and characterization", 2015 50th ACS Junior Technical Meeting, San Juan, Puerto Rico, March 2015. Presented by: Carlos Garcia and Karlene Vega
2. "Synthesis and characterization", 2015 50th ACS Junior Technical Meeting, San Juan, Puerto Rico, March 2015. Presented by: Liz Santiago and Valerie Gómez
3. "Preparation and Characterization of Palladium Based Catalyst for Fuel Cell Application" 2015 50th ACS Junior Technical Meeting, San Juan, Puerto Rico, March 2015. Presented by: Glory Angelee Toro Cruz.
4. "Characterization of cellulose nanocrystals (CNCs) extracted from wood for use in water remediation of contaminants of emerging concern". June 2015. 11vo Congreso Internacional de Ciencia y Tecnología, República Dominicana, Presented by: Jairo Morales Herrera (Poster and Oral)
5. "Characterization of cellulose nanocrystals (CNCs) extracted from wood for use in water remediation of contaminants of emerging concern". June 2015. 11vo Congreso Internacional de Ciencia y Tecnología, República Dominicana, Presented by: Jairo Morales Herrera
6. "A study on the use of nanocellulose-based composites for applications in forward osmosis" June 2015. 11vo Congreso Internacional de Ciencia y Tecnología, República Dominicana, Presented by: Tania González Robles

List of your presentations (July 2014 - June 2015):

Nothing to report

List of your Natural Sciences collaborators during July 2014 - June 2015:

1. Prof. Harry Rivera (Interamerican University of Bayamon)
2. Prof. Carlos I. González (UPR-RP)

Academic achievements and distinctions for the period July 2014 - June 2015:

Nothing to report

Dr. José A. Prieto

1. Lista de publicaciones para el periodo entre julio de 2014 y junio 2015

"Crystal structure of (-)-(2R,3S,4R,5R)-5-(1,3-dithian-2-yl)-3-methyl-1-(triisopropylsilyloxy)hexane-2,4-diol", Cruz-Montanez, A.; Piñero Cruz, D. M.; Prieto, J. A., Acta Cryst. 2014, E70, 1285–1286.

2. Lista de presentaciones para el periodo de julio de 2014 y junio 2015. Favor de especificar aquellas presentaciones que fueron hechas por estudiantes.

Estudiante:

"Epoxide approach towards the synthesis of the polypropionate acid moiety of dolabriferol", Keyla Morales and José A. Prieto*, 249th ACS National Meeting & Exposition, March 22-26, 2015, Denver, CO.

Profesor:

"An Epoxide-based Methodology for the Non-aldol Construction for Polypropionate Synthesis", Keyla Morales, José A. Prieto*, XI International Congress of Scientific Research, June 10-12, 2015, Santo Domingo, Dominican Republic.

3. Nombres de los colaboradores en la facultad que aparecen como coautores en sus publicaciones.

Dr Dalice Piñero

4. Logros y distinciones alcanzados durante el periodo de julio de 2014 y junio 2015

El Dr. Prieto participó en octubre 2014 de un panel de evaluación de propuesta del Programa CARRERS de la NSF.

Dr. Néstor M. Carballeira

List of publications (July 2014 - June 2015)

D. J. Sanabria-Ríos, Y. Rivera-Torres, C. Ríos, R. Gutiérrez, **N. M. Carballeira**, C. E. Vélez-Gerena, B. Zayas, F. Alvarez-Colón, G. Ortiz-Soto, V. Serrano, J. Altieri-Rivera, E. Ríos-Olivares, J. W. Rodríguez "Synthesis of Novel C5-Curcuminoid Fatty Acid Conjugates and Mechanistic Investigation of their Anticancer Activity", *Bioorg. Med. Chem. Lett.*, 25, 2174-2180 (2015).

N. M. Carballeira, A. G. Bwalya, M. A. Itoe, A. D. Andricopulo, M. L. Cordero-Maldonado, M. Kaiser, M. M. Mota, A. D. Crawford, R. V. C. Guido, and D. Tasdemir "2-Octadecynoic Acid as a Dual Life Stage Inhibitor of Plasmodium Infections and Plasmodial FAS-II Enzymes", *Bioorg. Med. Chem. Lett.*, 24, 4151-4157 (2014).

D. J. Sanabria-Ríos, Y. Rivera-Torres, G. Maldonado-Domínguez, I. Domínguez, C. Ríos, D. Díaz, J. W. Rodríguez, J. S. Altieri-Rivera, E. Ríos-Olivares, G. Cintrón, N. Montano, and **N. M. Carballeira** "Antibacterial Activity of 2-Alkynoic Fatty Acids Against Multidrug Resistant Bacteria", *Chem. Phys. Lipids*, 178, 84-91 (2014).

D. Oyola-Robles, C. Rullán Lind, **N. M. Carballeira**, and A. Baerga Ortiz "Expression of Dehydratase Domains from a Polyunsaturated Fatty Acid Synthase Increases the Production of Fatty Acids in *Escherichia coli*", *Enzyme Microb. Tech.*, 55, 133-139 (2014).

List of presentations by your students (July 2014 - June 2015):

Montano, N., Carballeira, N. M., Reguera, R. M., Balaña-Fouce, R., Rivera-Torres, Y., and Sanabria-Rios D. "Synthesis of 2-Methoxylated Acetylenic Fatty Acids as Possible L. Donovanii Top1B Inhibitors, Antibacterial, and Antimicrobial Agents", Annual Meeting of the American Association for the Advancement of Science (AAAS 2015), San José McEnery Convention Center, San José, California, February 12-16, 2015.

Morales-Guzmán, C. and Carballeira, N. M. "Total Synthesis of $\Delta^{5,9}$ Brominated Fatty Acids and Analogs for Biological Activity Evaluation", 50th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 35th Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico, Río Piedras, March 14, 2015.

Rosado-Gómez, K., Jiménez, L. Orellano, E., and Carballeira, N. M. "RT Inhibition Activity of Pentacosynoic and Pentacosenoic Acids", 50th Junior Technical Meeting,

American Chemical Society, Puerto Rico Section & 35th Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico, Río Piedras, March 14, 2015.

Adorno-Rivera, C., Carballeira, N. M., Montano, N., and Marrero, W. "First Total Synthesis of (2R,5Z,9Z,13Z)-2-Methoxy-5,9,13-octadecatrienoic Acid Isolated from the Caribbean Sponge *Asteropus niger*", 50th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 35th Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico, Río Piedras, March 14, 2015.

List of your presentations (July 2014 - June 2015):

Carballeira, N. M. "The Medicinal Chemistry of the 2-Alkynoic Fatty Acids – from Parasitic Protozoa to Neuroblastoma Cells and Beyond", Department of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia, September 24, 2014.

Carballeira, N. M., Montano, N., Adorno, C., Rodríguez, A., Golovko, M. Y., and Golovko, S. A. "Novel α -Methoxylated Fatty Acids and Galactocerebrosides with Potential Biological Activities from the Caribbean Sponge *Asteropus niger*", 248th American Chemical Society National Meeting & Exposition, San Francisco, California, August 10-14, 2014.

Carballeira, N. M. and Badal-McCreath, S. "Research of Biologically Active Compounds in Puerto Rico: Opportunities and Challenges", Panel Discussion at the AAAS-Caribbean Division Annual Meeting, University of Turabo, Gurabo, Puerto Rico, September 20, 2014.

Carballeira, N. M. "The Total Synthesis of Strychnine", 73th Chemical Conference and Exhibition- PR Chem 2014, Ritz Carlton Convention Center Hotel & Casino, San Juan, Puerto Rico, July 29 -August 2, 2014.

List of your Natural Sciences collaborators during July 2014 - June 2015:

Dr. Abimael Rodríguez

Academic achievements and distinctions for the period July 2014 - June 2015:

President of the Board of Examiners of Chemists of Puerto Rico
Chair of the NIH-NIGMS Training and Workforce Development Review Subcommittee (TWD-D).

Dr. John A. Soderquist

Presentations

Sequential Asymmetric Conversions with the Amazing BBDs, John A. Soderquist, Lorell Muñoz-Hernández, Eduvigis González, Eyleen Alicea, BORAM XIV, Rutgers University, Newark, NJ, June 19, 2014.

Sequential Asymmetric Conversions with the Amazing BBDs, John A. Soderquist, Invited Lecture, University of Tennessee, Knoxville, TN, October 2, 2014.

Sequential Asymmetric Conversions with the Amazing BBDs, John A. Soderquist, Invited Lecture, Florida International University, Miami, FL, October 24, 2014.

Publications

(E)-2-Boryl-1,3-dienes from the 10-TMS-9-BBDs: Highly Selective Reagents for the Asymmetric Synthesis of anti- α,β -Disubstituted- β -allenylamines from the Allylboration of Aldimines, González, J. A.; Soderquist, J. A. *Org. Lett.*, 2014, 16 (14), pp 3840–3843, DOI: 10.1021/ol501892a

Highly Functionalized tertiary-Carbinols and Carbinamines from the Asymmetric γ -Alkoxyallylboration of Ketones and Ketimines with the Borabicyclodecanes, Muñoz-Hernández, L.; Seda, L. A.; Wang, B.; Soderquist, J. A. *Org. Lett.*, 2014, 16, ASAP, DOI: 10.1021/ol5019486

Dr. Pasquale Fernando Fulvio

List of publications (July 2014 - June 2015)

1. Alberto Villa, Marco Schiavoni, Carine E Chan-Thaw, Pasquale F. Fulvio, Richard T. Mayes, Sheng Dai, Karren L. More, Gabriel M. Veith, Laura Prati, Acid-Functionalized Mesoporous Carbon: An Efficient Support for Ruthenium-Catalyzed γ -Valerolactone Production, *ChemSusChem*, doi: 10.1002/cssc.201500331, 2015.
2. Craig E. Barnes, Katherine Sharp, Austin A. Albert, Michael E. Peretich, Pasquale Fulvio, Peter N. Ciesielski, Bryon S. Donohoe, Metal-silicate catalysts: Single site, mesoporous systems without templates, *ScienceJet*, 4 (107), 2015.
3. Jennifer Achtyl, Raymond Unocic, Lijun Xu, Yu Cai, Muralikrishna Raju, WeiWei Zhang, Robert Sacci, Ivan Vlassioun, Pasquale Fulvio, Panchapakesan Ganesh, David Wesolowski, Sheng Dai, Adri van Duin, Matthew Neurock, and Franz Geiger, Aqueous proton transfer across single-layer graphene. *Nat. Commun.* 6:6539 doi: 10.1038/ncomms7539, 2015.
4. Yanfeng Yue, Bingkun Guo, Zhen-An Qiao, Pasquale F. Fulvio, Jihua Chen, Andrew J. Binder, Chengcheng Tian and Sheng Dai, Multi-Wall Carbon Nanotube@Zeolite Imidazolate Framework Composite from a Nanoscale Zinc Oxide Precursor, *Microporous and Mesoporous Materials*, 198, 139-143, 2014.

List of presentations by your students (July 2014 - June 2015):

N/A

List of your presentations (July 2014 - June 2015):

1. 16th ISE Topical Meeting, Angra dos Reis-Brazil: Tailoring the electronic conductivity in "brick and mortar" ordered mesoporous carbon - graphitic carbon nanostructures supercapacitor electrodes.
2. Micromeritics Corp., Norcross-GA. The title of my talk was "Tailored Surface Acidity in Soft-Templated Mesoporous Carbons".

List of your Natural Sciences collaborators during July 2014 - June 2015:

Dr. Carlos Cabrera, Dr. Kai Griebenow, Dr. Eduardo Nicolau, Dr. Liz Diaz, Dr. Loretta Roberson, Dr. Gary Gervais, Dr. Clifford Louime, Dr. Steven Massey, Dr. Gerardo Morell, Dr. Brad Weiner, Dr. Jorge Colon. Dr. Zhongfang Chen

Academic achievements and distinctions for the period July 2014 - June 2015:

Recipient of a IFN NSF-EPSCoR award, proposal title "Synthesis and Characterization of Open Porous Organic Frameworks and Carbonaceous Materials with Controllable Subnanometer Pore Sizes of Interest for Energy Storage and Conversion" (US\$200,000.00)

Dra. Dalice M. Piñero Cruz

List of publications (July 2014 - June 2015)

- 1) "Crystal structure of (-)-(2R,3S,4R,5R)-5-(1,3-dithian-2-yl)-3-methyl-1-(triisopropylsilyloxy)hexane-2,4-diol" Acta Cryst., 2014, E70, o1285–o1286 (Published on November 2014)

List of presentations by your students (July 2014 - June 2015):

- 1) Nataniel Medina has presented his work Bulk synthesis of TCNQ radical anion salts: Development of Paramagnetic linkers:

- ACS Junior technical meeting at UPRRP, April 2015; Oral Presentation
- 3er Encuentro Subgraduado de Investigacion y Creacion, Poster

- 2) Keily Gutierrez presented a poster this last April at the 4th Congress of Graduate Studies organized by the "Decanato de Estudios Graduados e Investigación" of title: Síntesis de 2'-hidroxi-1'-acetonaftona y 2'-hidroxi-3'-acetonaftona: 2 intermediarios útiles para la síntesis de magnetos moleculares

List of your presentations (July 2014 - June 2015):

- 1) Invited speaker at the Crystallography Symposium during the 73rd Conference and Exhibition of the PR Chem 2014 organized by the Colegio de Químicos de Puerto Rico.

The title of my talk was: Tailoring new cyanide linked 3d and 3d-4f metal complexes from common amine based ligands: A crystallographic view. July 31, 2014.

2) RISE Seminar at UPRRP: Coordination Chemistry applied to the synthesis of paramagnetic complexes: future applications in Magnetic Resonance Imaging and memory devices. October 31, 2014.

List of your Natural Sciences collaborators during July 2014 - June 2015:

1) Dr. José Prieto, Chemistry Dept.

2) Dr. Luis Fonseca, Physics Dept.

Academic achievements and distinctions for the period July 2014 - June 2015:

Distinctions

1) 2014-2016 FIPI Award for the project: Development of Molecular Magnets and Nanomaterials for applications in memory devices following a Rotationally-Oriented Ligand Design (ROLD) approach

2) 2015-2017 NSF-IFN Setup Grant for the project: Project: Multimodal theranostic nanoprobes for non-invasive bioimaging and photothermal treatment of cancer

Achievements:

1) Creation of the new elective course: Inorganic Chemistry Laboratory

Dr. Kai Griebenow

1. Lista de publicaciones para el periodo entre julio de 2014 y junio 2015

Ejemplos:

[1] Delgado Y, Moraima Morales-Cruz, José Hernández-Román, Glinda Hernández, Kai Griebenow (2015) Development of HAMLET-like Cytochrome c-Oleic Acid Nanoparticles for Cancer Therapy, J. Nanomed. Nanotechnol., in press.

[2] Molina AM, Morales-Cruz M, Benítez M, Berrios K, Figueroa CM, Griebenow K (2015) Redox-sensitive cross-linking enhances HSA nanoparticle function as delivery system for photodynamic cancer therapy. J. Nanomed. Nanotechnol., in press.

[3] Delgado Y, Morales-Cruz M, Figueroa CM, Hernández-Román J, Hernández G, Griebenow K (2015) The cytotoxicity of BAMLET complexes is due to oleic acid and independent of the α -lactalbumin component, FEBS Open Bio, 5, 397-404.

[4] Hernández-Cancel G, Suazo-Dávila D, Medina-Guzmán J, Rosado-González M, Díaz-Vázquez LM, Griebenow K (2015) Chemical glycosylation to improve the stability of an amperometric horseradish peroxidase biosensor. Anal. Chim. Acta, 854, 129-139.

[5] Pagán M, del Toro N, Suazo D, Griebenow K (2014) A comparative study of different protein immobilization methods for the construction of an efficient nanostructured lactate oxidase-CNT-biosensor. Biosensors & Bioelectronics 64: 138-146.

[6] Morales-Cruz M, Figueroa CM, González-Robles T, Delgado-Reyes Y; Molina A, Méndez J, Morales M, Griebenow K (2014) Activation of caspase-dependent apoptosis by intracellular delivery of cytochrome c-based nanoparticles. J. Nanobiotechnology 12:33

- [7] Yamixa Delgado, Moraima Morales-Cruz, José Hernández-Román, Yashira Martínez and Kai Griebenow (2014) Chemical glycosylation of cytochrome c improves physical and chemical protein stability. *BMC Biochemistry* 15:16
- [8] Nicolau E, Fonseca, JF, Rodriguez Martinez JA, Richardson T-M, Flynn M, Griebenow K, Cabrera CR (2014) Evaluation of a urea bioelectrochemical system for wastewater treatment processes. *ACS Sustainable Chem. & Eng.* 2(4) : 749-754.
- [9] Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. *Mol. Pharm.* 11(1):102-11. PMCID: PMC3905321

2. Lista de presentaciones para el periodo de julio de 2014 y junio 2015. Favor de especificar aquellas presentaciones que fueron hechas por estudiantes.

1. J. Ramirez-Paz, M. Saxena, R.K. Sharma, K. Griebenow. Effects of site-selective glycosylation of L-asparaginase II on its structure, activity and stability. 29th AAAS Caribbean Division Meeting. September 20th, 2014. Caguas, Puerto Rico.
2. J. Ramirez-Paz, M. Saxena, R.K. Sharma, K. Griebenow. Site-selective glycosylation of L-asparaginase II: effects on structure, activity and stability. 1st Puerto Rico Cancer Research Meeting. October 3rd, 2014. Carolina, Puerto Rico.
3. Ramirez-Paz J, Saxena M, Sharma R, and Griebenow K (2014) Enhancing the stability of L-asparaginase II by chemical glycosylation. ACS Senior Technical Meeting, November 7, 2014, Old San Juan.
4. Hernández-Cancel, Griselle, Suazo-Dávila, D, Díaz-Vázquez L., and Griebenow, Kai (2014) Chemically glycosylation improves the stability of an amperometric horseradish peroxidase biosensor. ACS Senior Technical Meeting, November 7, 2014, Old San Juan.
5. J. Ramirez-Paz, M. Saxena, R.K. Sharma, K., Griebenow (2014) Enhancing the stability of L-asparaginase II by chemical glycosylation. NSF EPSCoR/IFN Annual Meeting 2014. November 7-8th, 2014. Caguas, Puerto Rico.
6. Pagán M., Del Toro N., Suazo, D., Griebenow K. (2014) A comparative study of different protein immobilization methods for the construction of an efficient nano-structured lactate oxidase-CNT-biosensor. NSF EPSCoR/IFN Annual Meeting 2014. November 7-8th, 2014. Caguas, Puerto Rico.
7. Rojas, V., Ramirez-Paz, J. & Griebenow K (2015) The effect of the signal peptide on L-asparaginase II secretion. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.
8. Rohit Kumar Sharma, Manoj Saxena, Josell Ramirez- Paz, and Kai Griebenow (2015) Development and application of renewable lipase nanoparticles in sustainable production of biodiesel and transformation of glycerol into pharmaceutical precursors. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.
9. Moraima Morales-Cruz, Alejandra Cruz, Tania González-Robles, Cindy Figueroa, Laura Muñoz, Anna Molina and Kai Griebenow (2015) Targeted Delivery of Cytochrome c-based Nanoparticles Coated with a Poly(lactic-co-glycolic acid)-Poly(ethylene glycol)-Folate Conjugate to HeLa Cells. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.

10. Jean Carlos Fernandez, Moraima Morales-Cruz, Bethzaida N Suarez, Cindy M Figueroa, Kai Griebenow (2015) Construction of a targeted delivery system based on hyaluronic acid and cytochrome c for cancer treatment. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.
11. Marimar Benitez, Anna M. Molina, and Kai Griebenow (2015) Development of an amygdalin delivery system for cancer treatment. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.
12. Josell Ramirez Paz, Manoj Saxena, Rohit K. Sharma, Kai Griebenow (2015) Site-specific glycosylation of L-asparaginase II: effects on structure, activity and stability. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.
13. Manoj Saxena, Josell Ramirez-Paz, Rohit Kumar Sharma, and Kai Griebenow (2015) Site specific chemical glycosylation of cytochrome c to enhance its stability for apoptosis induction in cancer cells. 2nd PR Cell Signaling Conference, San Juan, April 10, 2015. [Selected for oral presentation.]
14. J. Davila, M. Morales Cruz, K. Rolon Reyes, M. Inyushin, K. Griebenow, L. Kucheryavykh (2015) Selective targeting of glioblastoma using folate-decorated nanoparticulate cytochrome c drug constructs. 2nd PR Cell Signaling Conference, San Juan, April 10, 2015.
15. Tania J. González-Robles, Moraima Morales-Cruz, Cindy M. Figueroa, Yamixa Delgado, Anna Molina, Jessica Méndez, Myraida Morales, and Kai Griebenow (2015) Activation of caspase-dependent apoptosis by intracellular delivery of cytochrome c-based nanoparticles. Conference of Experimental Biology, March 28 to April 1, 2015, Boston Convention & Exhibition Center, 415 Summer St, Boston, MA 02210

3. Nombres de los colaboradores en la facultad que aparecen como coautores en sus publicaciones.

Dr. Carlos Cabrera
 Dr. Eduardo Nicolau
 Dr. Liz Diaz

3. Logros y distinciones alcanzados durante el periodo de julio de 2014 y junio 2015

Dr. Brad R. Weiner

List of publications (July 2014 - June 2015)

Publications - Refereed Journals

126. Khaled Habiba, Dina P Bracho-Rincon; Jose A Gonzalez-Feliciano; Vladimir I. Makarov; Darinel Ortiz; Javier A. Avalos; Carlos I. Gonzalez; Brad R Weiner; Gerardo Morell, "Antibacterial Activity of Silver-Graphene Quantum Dots Nanocomposites against Gram-Positive and Gram-Negative Bacteria", 2015, Acta Biomaterialia, Submitted.

125. Daysi Diaz-Diestra, Juan Beltran Huarac, Cina P. Bracho-Rincon, Jose A. Gonzalez-Feliciano, Carlos I. Gonzalez, Brad R. Weiner and Gerardo Morell, "Water-synthesized ZnS:Mn Quantum Dots for Multiple biological Detection and Enzyme Immobilization: An Emerging Biomaterial", 2015, J. Phys. Chem. B. Submitted
124. Javier Palomino, Deepak Varshney, Brad R. Weiner and Gerardo Morell, "Study of the Structural Changes Undergone by Hybrid Nanostructured Si-CNTs Employed as an Anode Material in a Rechargeable Lithium-Ion Battery", 2015, J. Phys. Chem. C. Accepted
123. Dionne Hernandez, Carlos R. Cabrera, Laura Mendez, Madeline Diaz-Serrano, Omar Vega, Brad R. Weiner and Luis G. Rosa, "Oxidized SWCNT Chemically Attached to a Modified Copper Substrate", 2015 Appl. Surf. Sci. 346, 415-422.
DOI: 10.1016/j.apsusc.2015.02.194
122. Rajesh K. Katiyar, Yogesh Sharma, Danilo G. Barrionuevo Diestra, Pankaj Misra, Sudheendran Koorlyattil, Shojan P. Pavunny, Gerardo Morell, Brad R. Weiner, James F. Scott, Ram S. Katiyar, "Unipolar Resistive Switching in Planar Pt/BiFe3O3/Pt Structure", AIP Advances 2015, 5, 037109.
DOI:10.1063/1.4914475
121. Frank Mendoza, Tej B. Limbu, Brad R. Weiner, Gerardo Morell, "Large-area Bilayer Graphene Synthesis in the Hot Filament Chemical Vapor Deposition Reactor", Diamond and Related Materials, 2015, 51, 34-38.
DOI: 10.1016/j.diamond.2014.11.001
120. Rajesh K. Katiyar, Yogesh Sharma, Pankaj Misra, Venkata S.Puli, Satyaprakash Sahoo, Ashok Kumar, James F. Scott, Gerardo Morell, Brad R. Weiner, Ram S. Katiyar, "Studies of the Switchable Photovoltaic Effect in Co-substituted BiFeO3 thin films" Appl. Phys. Lett. 2014 105, 172904.
119. Javier Palomino, Deepak Varshney, Oscar Resto, Brad R. Weiner and Gerardo Morell, "Ultrananocrystalline Diamond-decorated Silicon Nanowires Field Emitters", ACS Appl. Mat. and Interfaces 2014 6, 13815.
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118. Juan Beltran-Huarac, Javier Palomino, Oscar Resto, Jingzhou Wang, Wojciech M. Jadwisieniczak, Brad. R. Weiner, and Gerardo Morell, "Highly Crystalline γ -MnS nanosaws", RSC Advances 2014, 4, 38103.
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117. Dionne M. Hernández, Frank Mendoza, Emmanuel Febus, Brad R. Weiner, and Gerardo Morell, "Binder Free SnO2-CNT Composite as Anode Materials for Li-ion Batteries", J. Nanotechnology, 2014, 381273.
DOI: 10.1155/2014/381273
116. José I López-Pérez, Edwin Ortiz-Quiles, Khaled Habiba, Mariel Jiménez-Rodríguez, Brad R. Weiner and Gerardo Morell, "Enhanced Structural Integrity and Electrochemical Performance of AlPO4-coated MoO2 Anode Material for Lithium-ion Batteries" ISRN Electrochemistry 2014,. 359019.
DOI: 10.1155/2014/359019
115. Juan Beltran-Huarac, Oscar Resto, Jennifer Carpeña-Núñez, Wojciech M. Jadwisieniczak, Luis F. Fonseca, Brad R. Weiner and Gerardo Morell, "Single Crystal γ -MnS Nanowires Conformally Coated with Carbon", ACS Appl. Mat. and Interfaces 2014, 6(2), 1180-1186.

DOI: 10.1021/am404746k

114. Deepak Varshney, Javier Palomino, Jennifer Gil, Oscar Resto, Brad R. Weiner and Gerardo Morell, "New Route to the Fabrication of Nanocrystalline Diamond Films", J. Appl. Phys. 2014, 115, 054304.

DOI: 10.1063/1.4863822

113. Frank Mendoza, Dionne M. Hernández, Vladimir Makarov, Emmanuel Febus, Brad R. Weiner, and Gerardo Morell, "Room Temperature Gas Sensor Based on Tin Dioxide-Carbon Nanotubes Composite Films", Sensors & Actuators: B. Chemical, 2014, 190, 227-233.

DOI: 10.1016/j.snb.2013.08.050

Publications - Proceedings and Book Chapters

23. Khaled Habiba, Vladimir I. Makarov, Brad R. Weiner and Gerardo Morell, "Fabrication of Nanomaterials by Pulsed Laser Synthesis", Chapter 10 in Manufacturing Nanostructures, 2014, One Central Press (OCP), Editors: Waqar Ahmed, Nasar Ali, pp.263-291

List of presentations by your students (July 2014 - June 2015):

1. A novel nano-platform for biosensing parabens, Daysi M Diaz-Diestra, Juan C. Beltran-Huarac, Glesmarie Ortiz-Zayas, Liz Díaz-Vázquez, Brad R. Weiner, Gerardo Morell, Materials Research Society Meeting, Boston, MA, November 30 – December 5, 2014.

2. Advance in 2D Nanomaterials: Graphene/Boron Nitride Nanosheets, Muhammad Sajjad, Frank Mendoza, Tej Limbu, Xianping P. Feng, Gerardo Morell, Brad R. Weiner, MRS Spring Meeting, San Francisco, California, April 6-10, 2015.

3. Anisotropic Single-Crystal γ -MnS Nanoribbons: Towards More Effective Light Emitters, Juan Beltran-Huarac, Oscar Resto, Jingzhou Wang, Wojciech M. Jadwisieniczak, Brad R. Weiner and Gerardo Morell, NSF EPSCoR/RII Annual Meeting, Caguas, PR, November 7-8, 2014.

4. Anisotropic Single-Crystal γ -MnS Nanoribbons: Towards More Effective Visible Light Emitters, Juan Beltran-Huarac, Oscar Resto, Jingzhou Wang, Wojciech M. Jadwisieniczak, Brad R. Weiner and Gerardo Morell, XI Congreso Internacional de Investigación Científica, Santo Domingo, Dominican Republic, June 10-12, 2015.

5. Anisotropic Single-Crystal γ -MnS Nanoribbons: Towards More Effective Visible Light Emitters, Juan Beltran-Huarac, Oscar Resto, Jingzhou Wang, Wojciech M. Jadwisieniczak, Brad R. Weiner and Gerardo Morell, 2014 Materials Research Society Fall Meeting, Boston, MA, November 30 - December 5, 2014.

6. Boron Nitride Nanoparticles for Safe and Efficient Hydrogen Storage and Transportation, Samuel Escobar, Frank Mendoza, Brad R. Weiner and Gerardo Morell, Hynes Convention Center, Boston, MA, MRS Fall Meeting, December 2014.
7. Catalytic Hydrothermal Liquefaction of the Macroalgae *Ulva fasciata*, Arnulfo Rojas-Pérez, Daysi Díaz-Diestra, Cecilia B. Frías-Flores, Juan Beltran-Huarac, K. C. Das, Brad R. Weiner, Gerardo Morell and Liz M. Díaz-Vázquez, Congreso Estudiantil de Investigación Graduada, University of Puerto Rico, San Juan, PR, USA, April 8-9, 2015.
8. Catalytic hydrothermal liquefaction of the macro-algae *Ulva fasciata*, A. Rojas-Pérez, C.B. Frías-Flores, D. Díaz-Diestra, J. Beltrán-Huarac, B.R. Weiner¹ G. Morell, L. Díaz-Vázquez, International Conference on Algal Biomass, Biofuels and Bioproducts, June 8-9, 2015.
9. Core/shell γ MnS/C nanowires: Synthesis, characterization and applications, Juan Beltran-Huarac, Oscar Resto, Wojciech M. Jadwisienczak, Brad R. Weiner and Gerardo Morell, 2014 Materials Research Society Fall Meeting, Boston, MA, November 30 - December 5, 2014.
10. Deposition of Graphene on Boron Nitride Nanosheets by HFCVD Technique, Muhammad Sajjad, Frank Mendoza, Xianping P. Feng, Brad R. Weiner, Gerardo Morell, IFN Meeting, Caguas, PR, November 7-8, 2014.
11. Dynamics of C₂H Radical in HFCVD Reactor During Diamond Thin Film Deposition, Tej B. Limbu, Vladimir Makarov, Brad R. Weiner, Gerardo Morell, XXIII International Materials Research Congress 2014, Cancún, México, August 17-21, 2014.
12. Effect of a Bias Voltage on the Bactericide Properties of Ag-GQD, Barbara Avalos-Cavero, Rebeca B. Rivera-Vázquez, Jorge R. Santiago-Jordi, Axel R. Arroyo, Mariel Jiménez-Rodríguez, Alejandra Guevara, Jennifer Gil-Acevedo, Khaled Habiba, Abelardo Colón, Javier A. Avalos-Sánchez, Brad R. Weiner, and Gerardo Morell, 2014 MRS Fall Meeting & Exhibit, Boston, Massachusetts, November 30 - December 5, 2014.
13. Ferroelectric Photovoltaic Effect in Pt/(Bi_{0.9}La_{0.1})(Fe_{0.97}Ta_{0.03})O₃/Graphene heterostructure, Rajesh K. Katiyar, Yogesh Sharma, Danilo Barrionuevo, Frank Mendoza, Shojan P. Pavunny, Gerardo Morell, Brad R. Weiner, and Ram S. Katiyar, 227th ECS Meeting May 24-28, 2015.
14. Ferroelectric Photovoltaic Effect in La and Ta Co-Doped BiFeO₃ Thin Films, Rajesh K. Katiyar, Yogesh Sharma, Danilo Barrionuevo, Sudheendran Kooriyattil, Shojan Pavunny, Gerardo Morell, Brad R. Weiner, Ram S. Katiyar, MRS San Francisco, April 6-10, 2015.

15. Graphene Quantum Dots in Cancer Theranostics, Khaled Habiba, Axel Arroyo, Joel Encarnación-Rosado, José A. Gonzalez, Dina Bracho, Jorge Santiago, Vladimir Makarov, Javier Avalos, Carlos I. Gonzalez, Gerardo Morell, Brad R Weiner, ACS Junior Technical Meeting/PRISM, University of Puerto Rico, Río Piedras Campus. San Juan, Puerto Rico, March 2015.
16. Graphene Quantum Dots in Cancer Theranostics, Khaled Habiba, Axel Arroyo, Joel Encarnación-Rosado, José A. Gonzalez, Dina Bracho, Jorge Santiago, Vladimir Makarov, Javier Avalos, Carlos I. Gonzalez, Gerardo Morell, Brad R Weiner, 2014 MRS Fall Meeting, Boston, Massachusetts, November 30-December 5, 2014.
17. ITO-equivalent Transparent Conductive Films Made of Bi-layer HFCVD Graphene, Frank Mendoza, Tej Limbu, Brad Weiner and Gerardo Morell, NSF EPSCoR Institute for Functional Nanomaterials Annual Meeting, Caguas, PR, November 7 - 8, 2014.
18. Large Area Bilayer Graphene Synthesis by HFCVD for Transparent Conductive Electrodes, Tej B. Limbu, Frank Mendoza, Oscar Resto, Brad R. Weiner and Gerardo Morell, 2015 Workshop on Multifunctional Nanomaterials, San Juan, Puerto Rico, January 15-16, 2015.
19. Large Area Bilayer Graphene Synthesis by HFCVD for Transparent Conductive Electrodes, Tej B. Limbu, Frank Mendoza, Oscar Resto, Brad R. Weiner and Gerardo Morell, 2015 Junior Technical Meeting/PRISM, University of Puerto Rico at Río Piedras, San Juan, Puerto Rico, March 14, 2015.
20. Multi-functional Silver Nanoparticles Decorated with Graphene Quantum Dots in Cancer Therapeutics, Khaled Habiba, Joel Encarnación-Rosado, Kenny García, José A. González, Vladimir Makarov, Javier Avalos, Gerardo Morell, Brad R Weiner, American Association for Cancer Research Annual Meeting, Philadelphia, PA, April 2015.
21. Nanodiamond Powder as Reusable Nontoxic Water Disinfection Material, Abelardo Colón, Jennifer Gil, Barbara Avalos, Rafael Rios, Javier A. Avalos-Sanchez, Brad. R. Weiner, and Gerardo Morell, 2014 MRS Fall Meeting, Boston, Massachusetts, November 30-December 5, 2014.
22. Novel γ -MnS nanowires as light source and for energy storage", Juan Beltrán-Huarac, Oscar Resto, Jingzhou Wang, Wojciech M. Jadwisieniczak, Brad R. Weiner and Gerardo Morell, 2015 Workshop on Multifunctional Nanomaterials, San Juan, PR, USA, January 14-16, 2015.
23. Photoconversion of NO_x species by SnO₂/Graphene/Graphene Oxide Composite for Water Treatment Applications, Laura Méndez, Samuel Escobar, Frank Mendoza, Brad R. Weiner and Gerardo Morell, Hynes Convention Center, Boston, MA, MRS Fall Meeting, December 2014.

24. Photosensitizing Activity in Mn-doped ZnS Nanoparticles, Daysi Díaz-Diestra, Juan Beltran-Huarac, Brad R. Weiner and Gerardo Morell, NSF EPSCoR/RII Annual Meeting, Caguas, PR, November 7-8, 2014.
25. Photovoltaic Effect in Ferroelectric ZnO:Al/(Bi_{0.9}La_{0.1})(Fe_{0.97}Ta_{0.03})O₃/Pt heterostructures, Rajesh K. Katiyar, Yogesh Sharma, Danilo Barrionuevo, Shojan P. Pavunny, Jamie Scott Young, Gerardo Morell, Brad R. Weiner, and Ram S. Katiyar, Workshop on Multifunctional Nanomaterials, San Juan Puerto Rico, January 14-16, 2015.
26. Physical Properties of BN-Graphene and Graphene-BN Heterostructures, Muhammad Sajjad, Frank Mendoza, Tej Limbu, Xianping P. Feng, Brad R. Weiner, Gerardo Morell, MRS Fall Meeting, Boston, Massachusetts, November 30 - December 5, 2014.
27. Physical Properties of HFCVD Bilayer Graphene, Tej B. Limbu, Frank Mendoza, Oscar Resto, Brad R. Weiner and Gerardo Morell, MRS Fall Meeting 2014, Boston, Massachusetts, November 30 to December 5, 2014.
28. Silicon Nanowires Conformally Coated with Ultrananocrystalline Diamond for New Generation Lithium-Ion Batteries, Rebeca Rivera, Javier Palomino, Deepak Varshney, Brad R. Weiner and Gerardo Morell, JTM-PRISM 2015, San Juan, PR, March 14, 2015.
29. Studies on LiMn_{1.5}Ni_{0.4}Cr_{0.1}O₄ Cathode Spinel combined with Graphene for Lithium ion Batteries, Rajesh K. Katiyar, Jifi Shojan, V.S.Puli, Satyaprakash Sahoo, Gerardo Morell, Brad R. Weiner, and Ram S. Katiyar, 227th ECS Meeting May 24-28, 2015.
30. Study of the C₂H Radical in Diamond Chemical Vapor Deposition: Experiment and Modeling, Tej B. Limbu, Vladimir I. Makarov, Brad R. Weiner and Gerardo Morell, MRS Fall Meeting 2014, Boston, Massachusetts, November 30 to December 5, 2014.
31. Synthesis of High-Quality and Large-Area Bilayer Graphene by Hot Filament Chemical Vapor Deposition, Tej B. Limbu, Frank Mendoza, Kenneth J. Pérez Quintero, Oscar Resto, Jean C. Hernández, Brad R. Weiner, Gerardo Morell, PR EPSCoR Annual Meeting 2014, Caguas, Puerto Rico, November 7-8, 2014.
32. Water-Synthesized ZnS:Mn Quantum Dots for Multiple Biological Detection and enzyme Immobilization, Daysi Díaz-Diestra, Juan Beltran-Huarac, Dina Brachorincon, José A. González-Feliciano, Carlos I. González, Brad R. Weiner and Gerardo Morell, XI Congreso Internacional de Investigación Científica, Santo Domingo, Dominican Republic, June 10-12, 2015.
33. Wireless Bacteria Sensor Base on Carbon Materials, Rafael Velazquez-Vicente, Barbara Avalos-Cavero, Rebeca B. Rivera-Vázquez, Jorge R. Santiago-Jordi, Axel R.

Arroyo, Mariel Jiménez-Rodríguez, Alejandra Guevara, Jennifer Gil-Acevedo, Khaled Habiba, Laura L. Méndez-Santacruz, Frank Mendoza, Javier A. Avalos-Sanchez, Brad. R. Weiner, and Gerardo Morell, 2014 MRS Fall Meeting, Boston, Massachusetts, November 30-December 5, 2014.

List of your Natural Sciences collaborators during July 2014 - June 2015:

1. Dr. Gerardo Morell, Department of Physics
2. Dr. Carlos I. González, Department of Biology
3. Dr. Liz Díaz Vázquez, Department of Chemistry
4. Dr. Ram S. Katiyar, Department of Physics
5. Dr. Maxime Guinel, Department of Physics
6. Dr. Vladimir I. Makarov, Department of Physics
7. Dr. Xianping P. Feng, Department of Physics

Academic achievements and distinctions for the period July 2014 - June 2015:

NEW UTILITY PATENT AWARDED:

Patent Number: US 8,784,766 B1

Title: Diamond Synthesis Employing Nanoparticle Seeds

Date Issued: July 22, 2014

Inventors: Kishore Uppireddi, Gerardo Morell, Brad R. Weiner

Abstract: Iron nanoparticles were employed to induce the synthesis of diamond on molybdenum, silicon, and quartz substrates. Diamond films were grown using conventional conditions for diamond synthesis by hot filament chemical vapor deposition, except that dispersed iron oxide nanoparticles replaced the seeding. This approach to diamond induction can be combined with dip pen nanolithography for the selective deposition of diamond and diamond patterning while avoiding surface damage associated to diamond-seeding methods.

Formulario R2

Facultad de Ciencias Naturales

Firma del Decano o Director: Dra. Nadia Cordero

Departamento de Ciencia de Química

Firma del Director del Departamento: Dr. Néstor M. Carballeira

PRIMER SEMESTRE DEL AÑO ACADÉMICO 2013-2014

Profesor (1)	Tipo Tarea (2)	Créditos Sust. (3)	Encomienda (4)	Labor Realizada (5)	Fecha Inicio (6)	Fecha Terminación (7)
Ana R. Guadalupe		4	Updating graduate courses	Course revision of Theory of Chemical Equilibria (Chem 6215) and Electroanalysis (Chem 8992) Revision of research literature to incorporate recent advances in the field. <ul style="list-style-type: none">• Identification, revision and acquisition of recently published and classic textbooks to support course bibliography.• Preparation of lectures on Power Point to create a modular library for students to study for exams, qualifiers and for future reference.• Creation of courses DropBox for student's access to electronic materials.• Beginning the incorporation of Excel for solving complex equilibria problems to create dynamic problem solving modular lectures.• Preparation of rubrics for the evaluation of students' course in Electroanalysis (Chem 8992).		
		6	Research	Submitted publication Electrochemical Studies of Positively-charged and Redox Active Copolymers of Poly(vinylferrocene-co-4-vinylpyridine) and Their Interaction with Calf-Thymus DNA Biomacromolecules, November 2013.		

			<p>Student presentations</p> <p>May 2014 – Enríquez González, Yanira; Rivera, Uriel; López, Andrea; Navarreto, Mónica; Díaz, Madeline, Ph.D.; Guadalupe Ana R., Ph.D.. NSF-PREM 8th Symposium: "Shape, Deformation, and Interaction Effects in Functional Soft Matter. <i>Electrochemical sensors for applications in human health</i>. Humacao, Puerto Rico.</p> <p>March 2014 - Rodríguez, Giovannie; Fajardo, Johanna; Enríquez, Yanira; Cedeño, Julio; Montes, Ingrid, Ph.D.; Guadalupe, Ana R., Ph.D. Lilly Academy Technical Forum. San Juan, Puerto Rico. <i>Ferrocenyl chalcones as precursors for potential biosensors</i> (co-author).</p> <p>March 2014 - Enríquez González, Yanira; Negrón, Yashira; Navarreto, Mónica; Guadalupe, Ana R., Ph.D. 10th RISE Area Conference: "Current Development in Protein-Protein Interaction". <i>An electrochemical approach for the detection of an ADP-ribosylating Exotoxin A from Pseudomonas aeruginosa</i>. San Juan, Puerto Rico.</p> <p>March 2014 - Cedeño, Julio; Fajardo, Johanna; Rodríguez, Giovannie; Enríquez, Yanira; Montes, Ingrid, Ph.D.; Guadalupe, Ana R., Ph.D. 49th ACS Junior Technical Meeting, 34th Puerto Rico Interdisciplinary Scientific Meeting. <i>Ferrocenyl chalcones as potential precursors for ferrocene polymers</i> (co-author). Cayey, Puerto Rico.</p> <p>March 2014 - López, Andrea; Díaz, Madeline, PhD; Enríquez, Yanira; Guadalupe, Ana R., Ph.D. 49th ACS Junior Technical Meeting, 34th Puerto Rico Interdisciplinary Scientific Meeting. <i>Electrochemical detection of Salmonella's DNA hybridization using Fc-Imidazole</i>. Cayey, Puerto Rico.</p> <p>November 2013 - Enríquez González, Yanira; López, Andrea; Navarreto, Mónica; Díaz, Madeline; Guadalupe, Ana R., Ph.D. NSF-PREM 10th Annual Meeting. <i>Development of electrochemical biosensors for the detection of pathogens</i>. Humacao, Puerto Rico.</p> <p>November 2013 - Navarreto, Mónica; Enríquez, Yanira; Guadalupe, Ana R., Ph.D. Annual. Biomedical Research Conference for Minority Students (ABRCMS). <i>Synthesis and characterization of a Ferrocene-NAAD for the detection of an opportunistic pathogen</i> (co-author). Nashville, Tennessee, U.S.A. (Presentation Award given to Mónica Navarreto - undergraduate student)</p> <p>Supervised 3 undergraduate students and 3 graduate students.</p>		
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				<p>Cyclic Heptapeptides from the Caribbean sponge <i>Prosuberites laughlini</i>. <i>Tetrahedron</i> 2013; 69, 10797-10804.</p> <p>Avilés, E, Rodríguez, AD, Vicente J. Two Rare-Class Tricyclic Diterpenes with Antitubercular Activity from the Caribbean Sponge <i>Svenzea flava</i>. Application of Vibrational Circular Dichroism Spectroscopy for Determining Absolute Configuration. <i>J Org Chem</i> 2013; 78, 11294-11301.</p> <p>Mayer, AMS, Rodríguez, AD, Taglialatela-Scafati, O, Fusetani, N. Marine Pharmacology in 2009–2011: Marine Compounds with Antibacterial, Antidiabetic, Antifungal, Anti-Inflammatory, Antiprotozoal, Antituberculosis, and Antiviral Activities; Affecting the Immune and Nervous Systems, and other Miscellaneous Mechanisms of Action. <i>Mar Drugs</i> 2013; 11, 2510-2573.</p> <p>Student Presentations</p> <p>9th Annual RISE Area Conference, University of Puerto Rico, Carolina, Puerto Rico, March 22, 2013. Co-author: Nieves, K. Title: Design, Synthesis, and Antitubercular Evaluation of Leningosterol.</p> <p>Supervised 4 undergraduate students, 3 graduate students, and 2 postdoctoral fellows.</p> <p>Submitted Proposals</p> <p>(1) NIH p97 Mechanism, Therapeutic Potential, and Physiologic Action Project Period: 07/01/13 – 06/30/18, University of Arizona – University of Puerto Rico \$ 250,000.00, Role: Co-PI</p> <p>(2) NIH Discovery and Investigation of PTP-1B Specific Inhibitors as Leads for Metabolic Disease Project Period: 07/01/13 – 06/30/18 University of Arizona – University of Puerto Rico \$ 250,000.00, Role: Co-PI</p>		
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Brad Weiner		6	Research	<p>Publications</p> <ol style="list-style-type: none"> 1. Juan Beltran-Huarac, Jennifer Carpeña-Nuñez, Danilo Barrionuevo, Frank Mendoza, Ram S. Katiyar, Luis F. Fonseca, Brad R. Weiner and Gerardo Morell, "Synthesis and Transport Properties of $La_{0.67}Sr_{0.33}MnO_3$ Conformally Coated on Carbon Nanotubes", Carbon, 2013, 65, 252-260. DOI: 10.1016/j.carbon.2013.08.023 2. Rafael Velazquez, Victor F. Neto, Kishorre Uppireddi, Brad R. Weiner and Gerardo Morell, "Fabrication of Nanodiamond Coating on Steel", Coatings, 2013, 3, 243-252. DOI:10.3390/coatings3040243 3. Khaled Habiba, Vladimir I. Makarov, Javier Avalos, Maxime J. F. Guinel, Brad R. Weiner, Gerardo Morell, "Luminescent Graphene Quantum Dots Fabricated by Pulsed Laser Synthesis" Carbon 2013, 64, 341-350. DOI: 10.1016/j.carbon.2013.07.084 4. Juan Beltran-Huarac, Jingzhou Wang, Hiroki Tanaka, Wojciech M. Jadwisienczak, Brad Weiner and Gerardo Morell, "Stability of the Mn Photoluminescence in Bifunctional $ZnS_{:0.05}Mn$ Nanoparticles", J. Appl. Phys. 2013, 114, 053106 DOI: 10.1063/1.4817371. 5. Deepak Varshney, Anirudha V. Sumant, Oscar Resto, Frank Mendoza, Kenneth Perez Quintero, Majid Ahmadi, Brad R. Weiner and Gerardo Morell, "Single-step route to hierarchical flower-like carbon nanotube clusters decorated with ultrananocrystalline diamond", Carbon 2013, 63, 253-262. DOI: 10.1016/j.carbon.2013.06.078 6. Juan Beltran-Huarac, Maxime J-F Guinel, Brad R. Weiner and Gerardo Morell, "Bifunctional $Fe_3O_4/ZnS:Mn$ Composite Nanoparticles", Materials Letters, 2013, 98, 108-111. DOI: 10.1016/j.matlet.2013.02.042 <p>Grants</p> <p>"Renovating Infrastructure for Tropical Ecology and Environmental Sciences", Brad R. Weiner (P.I.), National Science Foundation, Funded: \$1,998,475 for 9/24/10-9/23/13.</p> <p>"University Research Center for Advanced Nanoscale Materials", Brad R. Weiner (co-</p>		
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				<p>P.I. with 12 others), National Aeronautics and Space Administration. Funded: \$6,500,000 for 10/1/08-12/31/13.</p> <p>“Maximizing Yield Through Integration (MYTI): Science and Math Education in the Context of a Disposing Society”, Brad R. Weiner (co-P.I. with 4 others, P.I. Ana R. Guadalupe), National Science Foundation-I3. Funded: \$1,250,000 for 9/30/11-9/29/16.</p> <p>Supervised 5 undergraduate students, 6 graduate students, and 1 postdoctoral fellow.</p>		
Carlos Cabrera		4AH	Research	<p>Publications</p> <ol style="list-style-type: none"> 1. Enid Contes-de Jesus, Diana Santiago, Gilberto Casillas-Garcia, Alvaro Mayoral, Cesar Magen, Miguel José-Yacamán, Jing Li, and Carlos R. Cabrera, “Platinum Electrodeposition on Unsupported Single Wall Carbon Nanotubes as Methane Sensing Material”, <i>Journal of The Electrochemical Society</i>, 2013, 160, H1-H7. 2. Lisandro Cunci, Chitturi Venkateswara Rao, Carlos Velez, Yasuyuki Ishikawa and Carlos R. Cabrera, “Graphene-Supported Pt, Ir and Pt-Ir Nanoparticles as Electrocatalysts for the Oxidation of Ammonia”, <i>Electrocatalysis</i> 2013, 4(1), 61-69. 3. Damaris Suazo-Dávila, Carlos R. Cabrera, “X-ray Photoelectron Spectroscopy and Ultradispersed Ruthenium Electrodeposition on 6-Mercaptohexanol Modified Platinum Electrodes for Methanol Oxidation”, <i>Electrochimica Acta</i> 2013 in press. 4. Rolando Guzmán-Blas, Christian L. Menéndez, Carlos A. Vélez, Estevão Rosim Fachini, Aaron Johnston-Peck, Sanjaya D. Senanayake, Dario Stacchiola, Kotaro Sasaki, and Carlos R. Cabrera, “Vulcan/Pt/Ce catalysts prepared by impregnation using EDTA for Direct Methanol Fuel Cell, Direct Ethanol Fuel Cell, and Polymer Electrolyte Membrane Fuel Cell”, <i>Smart Grid and Renewable Energy</i>, 2013, 4, 1-9 http://dx.doi.org/10.4236/sgre.2013.47A001. 5. Lisandra Arroyo-Ramírez, Raphael G. Raptis and Carlos R. Cabrera, “Surface Analysis Characterization of Palladium-Cobalt Nanoring Formation from 		

				<p>Molecular Precursor $[\text{Et}_3\text{NH}]_2[\text{CoPd}_2(\square\text{-4-1-3,5-Me}_2\text{pz})_4\text{Cl}_4]$ on Highly Ordered Pyrolytic Graphite”, <i>Surf. Interface Anal.</i> 2013, <i>45</i>, 1760–1768. DOI: 10.1002/sia.5318</p> <p>6. Rolando Guzmán Blas, Dámaris Suazo-Dávila, Carlos Enrique Daza, Rafael Molina, C. Velez, D. Stacchiola, K. Sasaki and Carlos R. Cabrera, “EDTA Assisted Ce(III)/Pt Vulcan XC-72 Catalyst Synthesis for Methanol Oxidation”, <i>Electrocatalysis</i> 2013, DOI 10.1007/s12678-013-0152-3.</p> <p>7. Rosario-Castro, B.I.; Contés-de-Jesús, E.J.; Lebrón-Colón, M.; Meador, M.A.; Scibioh, M.A.; Cabrera, C.R. “Lithium Electrointercalation at Single-wall carbon nanotubes chemically attached on platinum electrodes”, <i>J. Electroanalytical Chem.</i>, 2013, <i>704</i>, 242-248. DOI:10.1016/j.jelechem.2013.06.011.</p> <p>8. Díaz Ayala, R.; Arroyo-Ramírez, L.; Raptis, RG, Cabrera, CR, “Thermal and Surface Analysis of Palladium Pyrazolate Molecular Precursors”, <i>Journal of Thermal Analysis and Calorimetry</i>, 2013 in press.</p> <p>9. Contés-de Jesús, E.; Cabrera, C.R.; Li, J. “Methane Detection at Room Temperature Under Humid Conditions Using Carbon Nanotubes Decorated with Platinum Nanoparticles”, <i>Sensors & Actuators: B. Chemical</i>, 2013 submitted.</p> <p>10. Li, Y.; Zhou, Z.; Cabrera, C.R.; Chen, Z. “Preserving the Edge Magnetism of Zigzag Graphene Nanoribbons by Ethylene Termination: Insight by Clar's Rule”, <i>Scientific Reports</i> 2013, <i>3</i>, Article number: 2030 doi:10.1038/srep02030.</p> <p>11. Arroyo-Ramírez, L.; Montano-Serrano, R.; Luna-Pineda, T.; Román, F.; Raptis, R.G. ; Cabrera, C.R., “Synthesis and Characterization of Palladium and Palladium-Cobalt Nanoparticles on Vulcan XC-72R for Oxygen Reduction Reaction”, <i>ACS Applied Materials & Interfaces</i> 2013, <i>5</i> (22), 11603-11612.</p> <p>12. Jing, Y; Zhou, Z.; Cabrera, C.R.; Chen, Z., “Metallic VS₂ Monolayer: A Promising 2D Anode Material for Lithium Ion Batteries”, <i>J. Phys. Chem. C</i>, 2013, <i>117</i> (48), 25409–25413. DOI: 10.1021/jp410969u</p>		
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				<p>Presentations</p> <ol style="list-style-type: none"> 1. "Bioelectrochemistry of Urea for Ammonia Fuel Cell Applications", The 64th Annual Meeting of the International Society of Electrochemistry, Querétaro, Mexico, September 10, 2013. (invited) 2. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", Department of Chemistry, University of Guanajuato, Guanajuato, Mexico, September 11, 2013. (invited) 3. "Faradaic and Non-Faradaic Electrochemical Biosensors", Metropolitan University, San Juan, Puerto Rico, December 2013. (invited) <p>Supervised 5 undergraduate students, 15 graduate students, and 2 postdoctoral fellows.</p> <p>Submitted Proposals</p> <ol style="list-style-type: none"> 1. NASA- Planetary Instrument Concepts for the Advancement of Solar System Observations (PICASSO), Development of an Unlabelled Real-time Impedimetric Polymerase Chain Reaction (PCR) Microchip for Astronauts Health Monitoring Applications, PI with one Co-PI. \$800,000, March 2014-Feb. 2017. Not funded. PI 2. Development of an impedimetric microchip sensor for real-time PCR (1 R21 GM111401-01), submitted to NIH. Not funded. Co-PI 		
Edwin Quiñones		7	Research	<p>Presentations</p> <p>37th ACS Senior Technical Meeting November 8, 2013 Courtyard Marriot Hotel and Casino, Aguadilla, P.R. "Analysis of the spontaneous unbraiding of two lambda DNA molecules evidences the formation of plectonemes" - Poster presentation</p>		

		3AH	Graduate Program Coordination	<p>Supervised 1 undergraduate student and 2 graduate students.</p> <ol style="list-style-type: none"> 1. Reclutamiento de estudiantes. 2. Asesoramiento de estudiantes. 3. Implementación de un plan de avalúo. 4. Coordinar exámenes de grado, presidir reuniones de la facultad del Programa, revisar reglamento, y asistir a reuniones del DEGI para estar informado de la nueva normativa. 5. Redactar cartas para informar a los estudiantes los resultados de los exámenes de grado, cartas dirigidas a la Oficina del Registrador informando cambios en el estatus de los estudiantes. 6. Evaluación de los expedientes académicos para determinar el progreso de los estudiantes. 7. Ofrecer talleres de cómo redactar las propuestas de los estudiantes. 8. A cargo de los cursos de investigación de todos los estudiantes del Programa. <p>Service</p> <p>Miembro del Comité Asesor del Congreso Internacional Interdisciplinario de Investigación Científica, Republica Dominicana (2005 - present)</p> <p>Evaluador de Propuestas para el Fondo Nacional de Innovación y Desarrollo Científico y Tecnológico, Santo Domingo, Republica Dominicana, August 30 – September 1, 2013.</p>		
Ingrid Montes		3	Research	<p>Presentations</p> <p>“Synthesis and characterization of 1,1’-diacetylferrocene derivatives as promising biological active compounds” <u>Ingrid Lehman Andino</u>, Myrna R. Otano Vega, Ingrid Montes González, ABRCMS, Nashville, TN, November 2013.</p> <p>“Designing a biological active framework based on ferrocenyl chalcones core”; <u>Juan C.</u>; <u>Aponte-Santini</u>, Ingrid Montes-González, Fernando J.Correa-Delgado; David J.Sanabria-Ríos; Ana Guadalupe-Quñones; Fathi Halaweish, Senior Technical</p>		

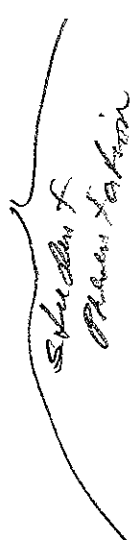
				<p>Meeting PR Local Section, Aguadilla, PR, November 2013.</p> <p>“University of Puerto Rico-Río Piedras ACS Student Chapter leading a footprint in our society” <u>Adolfo E Barragán Cabrera</u>; Raúl Martínez Quiñones; Edmarie Santiago Aponte; Ingrid Montes González, Senior Technical Meeting PR Local Section, Aguadilla, PR, November 2013.</p> <p>Ferrocenyl Chalcones: A versatile core, Universidad de Concepción, Concepción, Chile, October 2013.</p> <p>Synthesis and applications of Ferrocenyl Chalcones, Pontificia Universidad Católica, Santiago, Chile, October 2013.</p> <p>The versatility of Ferrocenyl Chalcones core, Universidad de los Andes, Bogotá, Colombia, September 2013.</p> <p>Adiestramiento voluntarios para el Festival de Química Universidad de Concepción, Concepción, Chile, October 2013. Pontificia Universidad Católica, Santiago, Chile, October 2013. Universidad de los Andes, Bogotá, Colombia, September 2013.</p> <p>Supervised 18 undergraduate students and 4 graduate students.</p> <p>Outreach Director-at-Large, Board of Directors-American Chemical Society Chair Long Range Planning Committee Division of Chemical Education of the American Chemical Society. Member of the Editorial Advisory Board, Journal of Chemical Education. Peer Reviewer: Journal of Chemical Educator and Journal of Chemical Education Development and implementation of "Festival de Química" an International ACS outreach program. Faculty Advisor-ACS-UPR-RP Student Chapter</p> <p>Community service in Puerto Rico</p>		
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		3	Vicepresidencia	<p>NCW Coordinator-ACS Puerto Rico Section CCED Coordinator-ACS Puerto Rico Section Project SEED Coordinator- ACS Puerto Rico Section Visit schools and work chemical demonstrations Coach High school students (Chem Clubs)</p> <p>Appointed by UPR President, Chair of the UPR Systemic Committee for improvement of the UPR Chemistry Program</p>		
Jorge Colón		3	Research	<p>Publications</p> <p>“Direct Intercalation of Cisplatin into Zirconium Phosphate Nanoplatelets for Potential Cancer Nanotherapy”, Agustín Díaz, Riviam J. Pérez, Amanda David, Millie L. González, Adriana Báez Tiffany B. Kinnibrugh, Paul Zhang, Abraham Clearfield, and Jorge L. Colón, <i>Nanoscale</i> 2013, 5, 11456-11463.</p> <p>Presentations</p> <p>(Invited) “FORO Ciencia y Vieques: 10 años después”, Colegio de Químicos de Puerto Rico, PRCHEM 2013, Río Grande, Puerto Rico, August 2013.</p> <p>(Invited) “Drug Delivery using Layered Structured Nanomaterials”, J. L. Colón, Interamerican University, San Juan, August 2013.</p> <p>“Anticancer drug delivery using zirconium phosphate nanoparticles”, 246th ACS National Meeting, Indianapolis, Indiana, September 2013.</p> <p>(Invited) “Drug Delivery using Layered Structured Nanomaterials”, J. L. Colón, Universidad Metropolitana, San Juan, October 2013.</p> <p>Natcha Vicente López; Barbara Casañas-Montes; José Agosto; Jorge L. Colón. <i>Novel CBZ-Intercalated ZrP Nanomaterials</i>. BioExpo, UPR-Carolina, November 2013, Poster presentation</p> <p>Supervised 5 undergraduate students and 4 graduate students.</p>		

				<p>Grants</p> <p>Caribbean Brigade of the CCI Solar Army, subaward del Centro de Innovación Química del Instituto Californiano de Tecnología, subvencionado por NSF. \$40,000. October 1, 2013-September 30, 2014.</p>		
José M. Rivera		7	<p>Research</p> <p><i>Student + Professor for 4 years</i></p>	<p>Publications</p> <p>Rivera, J. M.; Silva-Brenes, D. “A Photoresponsive Supramolecular G-Quadruplex” <i>Org. Lett.</i> 15, 2350–2353 (2013).</p> <p>Presentations</p> <p>María del C. Rivera-Sánchez; Ana V. Morales-de-Echegaray; Marilyn García-Arriaga; Gerard Hobley; José M. Rivera '8-Aryl-2'-deoxyguanosine derivatives as G-quadruplex DNA Ligands' Supramolecular Chemistry Symposium at the 65th Southeastern Regional Meeting of the ACS (SERMACS), Atlanta, GA; November 14, 2013. (Oral)</p> <p>Luis M. Negrón; José M. Rivera 'Supramolecular pH-Responsive G-quadruplexes' Supramolecular Chemistry Symposium at the 65th Southeastern Regional Meeting of the ACS (SERMACS), Atlanta, GA; November 14, 2013. (Oral)</p> <p>“Hierarchical Functional Assemblies Based on Supramolecular G-quadruplexes” Supramolecular Chemistry Symposium at the 65th Southeastern Regional Meeting of the ACS (SERMACS), Atlanta, GA; November 14, 2013. [Invited]</p> <p>Supervised 3 undergraduate students and 6 graduate students.</p> <p>Grants</p> <p>Title: Center for Materials Research at the University of Florida Subtitle: IRG 2: Hierarchical Mesoscale Assembly of Multicomponent Organic Functional Materials, Funding Agency: National Science Foundation</p>		

				<p>Date of Submission (NSF preproposal): 08/26/13 Total Funding: \$20,856,000 PIs: D. Talham, E. Douglas, C. Rinaldi, S. Sinnott, and J. Xue, Status: Declined</p> <p>Title: Stimuli-Responsive Supramolecular G-quadruplexes Funding Agency: National Science Foundation, NSF Program: Macromolecular/Supramolecular/Nanochemistry, Date of Submission (NSF preproposal): 11/15/13, Total Funding: \$233,242 PI: Jose Rivera-Ortiz, Status: Declined</p>		
John Soderquist		4	research	<p>Presentations</p> <p><i>Sequential Asymmetric Conversions with the Amazing BBDs</i>, John A. Soderquist, Invited Lecture, Massachusetts Institute of Technology, Cambridge, MA, October 10, 2013.</p> <p>Supervised 2 undergraduate students and 4 graduate students.</p>		
Lillian Bird		3	Mejoramiento de la enseñanza	<p>Durante este semestre se ofreció la prueba diagnóstica de literacia espacial a estudiantes subgraduados de Ciencias Naturales y Ciencias Sociales, y se analizó y realizó las pruebas estadísticas a la prueba diagnóstica que se ofreció a maestros de ciencias y estudios sociales durante el verano de 2013. Una vez se tenga los resultados y los análisis estadísticos de los estudiantes de escuela superior, los maestros y los estudiantes subgraduados, se procederá a publicar los resultados en una revista evaluada por pares.</p>		
		3	Coordinación de QUIM 3001 (Conferencia)	<p>La coordinación de este curso conlleva la actualización del prontuario del curso, la preparación del programa y el calendario del curso, la actualización de la página de Blackboard para todos los estudiantes del curso, la programación de fechas de exámenes parciales, la selección y solicitud de salones para esas fechas, la conducción</p>		

			<p>was featured in the <i>Global Medical Discovery Series</i>).</p> <p>Presentations</p> <p>Carballeira, N. M. “The Medicinal Chemistry of the 2-Alkynoic Fatty Acids – from Protozoa to Cancer Cells and Beyond”, Department of Chemistry, University of Puerto Rico, Rio Piedras, Puerto Rico, February 21, 2013.</p> <p>Rosado, K., Orellano, E. A., Cartagena, M., and Carballeira, N. M. “(±)-2-Methoxy-6-icosynoic acid: A Novel Fatty Acid with Anticancer Activity”, Annual Biomedical Conference for Minority Students (ABRCMS), Nashville, Tennessee, November 13-16, 2013. (<i>The undergraduate student was recognized with an award for this work in the Biochemistry discipline</i>)</p> <p>Montano, N., Marrero, W. O., and Carballeira, N. M. “Total Synthesis of (±)-2-Methoxy-6-octadecenoic acid, Identified in the Caribbean Sponge <i>Spheciospongia cuspidifera</i>, as Possible Therapeutic Agent against Neuroblastoma Cells”, Southeastern Regional Meeting of the American Chemical Society (SERMACS 2013), Loews Hotel, Atlanta, Georgia, November 12-16, 2013.</p> <p>Montano, N., Carballeira, N. M., Álvarez-Velilla, R., Prada, C. F., Reguera, R. M., and Balaña-Fouce, R. “Total Synthesis of (5Z,9Z)-2-Methoxy-5,9-eicosadienoic acid from the Caribbean Sponge <i>Erylus goffrilleri</i> – a Good Inhibitor of the <i>Leishmania donovani</i> Topoisomerase IB”, 245th American Chemical Society National Meeting & Exposition, New Orleans, Louisiana, April 7-11, 2013.</p> <p>Cintrón, G. A., Orellano, E. A., and Carballeira, N. M. “2-Octadecynoic Acid Displays Antineoplastic Activity Against Neuroblastoma via Lactate Dehydrogenase Release”, 245th American Chemical Society National Meeting & Exposition, New Orleans, Louisiana, April 7-11, 2013.</p> <p>Montano, N. and Carballeira, N. M. “Total Synthesis of (5Z,9Z)-2-Methoxy-5,9-</p>		
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				<p>Icosadienoic Acid and Analogs as Possible Inhibitors of Cell Growth in Human Neuroblastoma SH-SY5Y Cells”, 48th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 33rd Puerto Rico Interdisciplinary Scientific Meeting, Turabo University, Gurabo, Puerto Rico, March 9, 2013.</p> <p>Marrero, W., Montano, N., and Carballeira, N. M. “Synthesis of (±)-2-Methoxy-6Z-octadecenoic Acid Identified in the Sponge <i>Spheciospongia cuspidifera</i> as Possible Inhibitor of Human Neuroblastoma SH-SY5Y Cells”, 48th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 33rd Puerto Rico Interdisciplinary Scientific Meeting, Turabo University, Gurabo, Puerto Rico, March 9, 2013.</p> <p>Rosado, K., Orellano, E. A., Cartagena, M. M., and Carballeira, N. M. “2-Methoxy-6-icosynoic Acid: A Novel Fatty Acid with Anticancer Activity”, 48th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 33rd Puerto Rico Interdisciplinary Scientific Meeting, Turabo University, Gurabo, Puerto Rico, March 9, 2013.</p> <p>Supervised 3 undergraduate students and 4 graduate students.</p>		
	12	Director Departamento de Química	Todas las labores inherentes al cargo.			
Noel Motta	6	Chemistry Department Academic Coordinator	<ul style="list-style-type: none">- Responsible for all aspects of the registration process and course scheduling of the department.- Work with the department’s faculty in course offerings, accreditation of new courses, course equivalency and counseling of students.- Participate in the College of Natural Sciences committees to implement new curriculum strategies.- Evaluate candidates for transfers and changes of majors.- Evaluate course content for course equivalency among UPR system, private institutions, community colleges and international institutions.			

		6	Chemistry Department Academic Advisor	<ul style="list-style-type: none"> - Update database and assist in the preparation of reports. - Work with the Graduate Program Coordinator in implementing effective strategies for course offerings, accreditation of courses, and counseling of graduate students. - Assist the Department Chair when necessary - Provide counseling to all 481 chemistry majors on all aspects of the chemistry curriculum, including co-curricular activities such as community service participation, scientific research involvement and internship (from Universities, Government and private sectors) opportunities. - Evaluate senior students to certify fulfillment of graduation requirements. 		
Rosa Betancourt		3 3	Mejoras al Curso de Q. Orgánica I Coordinación Q. Orgánica I	<p>Búsqueda y estudio de Literatura: Identifiqué y estudié publicaciones sobre los temas que enseñamos en Química Orgánica durante el primer y segundo semestre. Compartí y discutí datos relevantes con los profesores a cargo de enseñar el curso.</p> <p>Mantenimiento Portales del Curso: Actualicé y mantuve los Portales del curso al día que incluye el programa del curso, los objetivos terminales, las guías de estudio, exámenes de años anteriores, portales relacionados con el curso, pruebas cortas, el programa del laboratorio, etc.</p> <p>Preparación Prontuarios Sistémicos: Preparé los prontuarios sistémicos de QUIM 3031 y QUIM 3032 en inglés y español. Además, preparé las descripciones de ambos cursos para el catálogo del Recinto.</p> <p>Manual: Trabajé en la Cuarta Edición del manual Aprendizaje Activo de la Química Orgánica- Parte II.</p> <p>Avalúo: Preparé, administré y resumí las evaluaciones del curso ambos semestres. Recogí datos que estamos analizando estadísticamente sobre la ejecutoria de los estudiantes en los objetivos terminales y cómo compara con la percepción que tienen de sus capacidades. También ausculté el sentir de los estudiantes sobre varios aspectos</p>		

				<p>que podrían afectar su ejecutoria en el curso tales como las tutorías, los trabajos grupales y la relevancia que tienen algunos temas del curso.</p> <p>Demostraciones: Preparé demostraciones para los estudiantes del curso que toman sus clases en el salón CN 251.</p>		
Liz Díaz		3	Research	<p>Presentations</p> <p>Robles, I; Reyes, Fuentes, M.; Diaz Vazquez, L.; <i>Bio-oil production from Caribbean macroalgae Acanthophora spicifera, Ulva lactuca and Sargassum spp. by Thermochemical Liquefaction</i>. 34rd Puerto Rico Interdisciplinary Scientific Meeting and 49th Junior Technical Meeting (JTM/PRISM 2013), University of of Puerto Rico, Cayey Campus, Puerto Rico.</p> <p>Bas, Jesbaniris; Perez, Marianita; Roberson Loretta; Díaz-Vázquez, Liz. <i>Analysis of Heavy Metal and Pollutants in Macro Algae from San Juan Bay Estuary</i>. 34rd Puerto Rico Interdisciplinary Scientific Meeting and 49th Junior Technical Meeting (JTM/PRISM 2013), University of Puerto Rico, Cayey Campus, Puerto Rico.</p> <p>Megna, Christopher; Rojas, Arnulfo; Diaz-Vazquez, Liz, <i>Catalytic upgrading of biofuels from macroalgae</i>. 34rd Puerto Rico Interdisciplinary Scientific Meeting and 49th Junior Technical Meeting (JTM/PRISM 2013), University of of Puerto Rico, Cayey Campus, Puerto Rico.</p> <p>Glesmarie Ortiz, Natalia Arocho, Alejandro Arroyo, Jorge Rivera, Ángel Morales, Liz Díaz. Development and comparison of two amperometric hrp-based biosensor constructions for the detection of phenolic compounds. August 2013, XXI International Material Research Congress 2013, Cancun Mexico.</p> <p>Grants</p> <p>Liz M. Diaz, CoPIs: Rosa Betancourt, Carlos Cabrera: Creating an Educational Pipeline in Science, Technology and Engineering (STEM) Initiative for Women and Minority students through Nanotechnology Authentic Research Projects” Submitted to the MSEIP Program - Department of Education</p>		

		3	Coordinación Q.3001L	<p>Supervised 10 undergraduate students and 3 graduate students.</p> <ol style="list-style-type: none">1. Preparación del itinerario del semestre que requiere la coordinación con el programa de conferencias y la selección de los experimentos, reactivos y materiales a utilizarse.2. Coordiné con la Oficina de Coordinación de Laboratorios, el Cuarto de Soluciones y la Oficina de OPASO para que los reactivos y materiales estén disponibles en los laboratorios en el momento designado y que se disponga correctamente de los desperdicios.3. Reuní a los instructores de laboratorio de QUIM-3001L dos a tres horas por semana. En estas reuniones se discutieron en detalle la teoría y el procedimiento de cada experimento. Se ofrecieron demostraciones y se presentaron problemas con los que se podrían confrontar durante los experimentos. También se compartieron las experiencias que han tenido los instructores en cada experimento y luego de analizar las situaciones se recomendaron soluciones. Estas reuniones son vitales para el buen funcionamiento del curso.4. Adiestre a los ayudantes de cátedra en estrategias de enseñanza que promueve el aprendizaje activo e inquisitivo en el salón de clases.5. Coordine el quinto simposio de investigación del curso de química general.6. Evalué a los Ayudantes de Cátedra. Esta evaluación se basa en la participación y asistencia a las reuniones de Coordinación, en su ejecutoria al preparar pruebas cortas y conducir los experimentos y en los resultados de la evaluación llevada a cabo por los estudiantes7. Preparación del examen final. Entrega de informe de notas de todos los estudiantes de QUIM-3001L a los profesores del curso.		
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				<p>Curricular material</p> <p>Prontuarios de los siguientes cursos de laboratorio QUIM 3001L, QUIM3002I, QUIM4015I. QUIM 5995 Técnicas forenses.</p> <p>Desarrollo de 10 manuales y videos de operación para los siguientes instrumentos: FTIR, GCMS, HPLC, AA, Fluorimetro, UVVIS, potencióstato purificador de agua nanopura, extractor de fluido supercrítico y HTL</p> <p>Desarrollo de tres experiencias de laboratorio: determinación de aditivos de sabor en cigarrillos, Producción y Caracterización de bioaceite a partir de macroalgas. Biosíntesis de nanopartículas de metales y su uso en celdas de combustible</p> <p>Desarrollo de rubricas para la evaluación de reportes de laboratorio y proyectos de investigación.</p>		
Rosa Flores		3	Coordinación de avalúo del aprendizaje estudiantil	<p>1.Participar de reuniones organizados por el Decanato de la Facultad de Ciencias Naturales del Recinto, para orientar a los Coordinadores de Avalúo del Aprendizaje Estudiantil en cuanto a las diversas funciones del cargo, y los diversos recursos de apoyo disponibles.</p> <p>2.Supervisar la implantación de los instrumentos de avalúo diseñados para medir el aprendizaje estudiantil en los dominios enfocados en este año académico 2013-2014.</p> <p>3.Recibir la data de avalúo enviada por los profesores y ayudantes de cátedra de los cursos participantes, y llevar acabo el análisis de la misma, enfocando los objetivos del plan de avalúo.</p> <p>4.Redactar el Informe Parcial de Avalúo del Aprendizaje Estudiantil para el año académico 2013-2014.</p> <p>5.Envíar la versión electrónica del Informe de Avalúo al Ayudante Académico del Programa de Química y al Decanato de la Facultad de Ciencias Naturales, para su referencia y distribución.</p> <p>Grants</p> <p>Proyecto realizado con fondos de una propuesta a Procter & Gamble (\$10,000) que se gestionó durante el año académico 2012-2013 en la UPR de Carolina.</p>		

				<p><u>Metas:</u> Estudiar la bioquímica de ciertos productos de Procter & Gamble (P&G) disponibles en el mercado para tratar las manchas y las arrugas en la piel. Desarrollar el proyecto que los estudiantes realizarán en el curso de laboratorio Técnicas Bioquímicas (QUIM 4865) en el segundo semestre.</p>		
Zhongfang Chen		7	Research	<p>Presentations</p> <p>Department of Theoretical Chemistry, Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, Germany College of Chemistry, Central China University of Science and Technology, Wuhan, China College of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, China College of chemistry, Huazhong Normal University, Wuhan, China Department of Physics, Dalian University of Technology, Dalian, China 6th International Conference on Computational Nanoscience and New Energy Materials Harbin, China Harbin Normal University, Harbin, China Nanoforum, Dalian University of Technology, Dalian, China</p> <p>Book chapters</p> <p>Introduction De-en Jiang,* Zhongfang Chen*</p> <p>Book chapter in Graphene Chemistry: Theoretical Perspectives, edited by De-en Jiang and Zhongfang Chen, John Wiley & Sons, 2013, Chapter 1</p> <p>Understanding Aromaticity of Graphene and Graphene Nanoribbons by Clar Sextet Rule Dihua Wu, Xingfa Gao, Zhen Zhou,* Zhongfang Chen* Book chapter in Graphene Chemistry: Theoretical Perspectives, edited by De-en Jiang and Zhongfang Chen, John Wiley & Sons, 2013, Chapter 3</p> <p>From Graphene to Graphene Oxide and back. Xingfa Gao, Yuliang Zhao, Zhongfang</p>		

			<p>ChenBook chapter in Graphene Chemistry: Theoretical Perspectives, edited by De-en Jiang and Zhongfang Chen, John Wiley & Sons, 2013, Chapter 13</p> <p>Graphene-Based Materials as Nanocatalysts, Fengyu Li, Zhongfang Chen* Book chapter in Graphene Chemistry: Theoretical Perspectives, edited by De-en Jiang and Zhongfang Chen, John Wiley & Sons, 2013, Chapter 15</p> <p>Hydrogen Storage in Graphene, Yafei Li, Zhongfang Chen* Book chapter in Graphene Chemistry: Theoretical Perspectives, edited by De-en Jiang and Zhongfang Chen, John Wiley & Sons, 2013, Chapter 16</p> <p>Journal articles</p> <p>8 Graphene-related Nanomaterials: Tuning Properties by Functionalization Qing Tang, Zhen Zhou,* <u>Zhongfang Chen*</u> <i>Nanoscale</i>, 2013, 5, 4541-4583. Highlighted as a cover picture</p> <p>7 CO Oxidation on TiO₂ (110) Supported Subnanometer Gold Clusters: Size and Lei Li, Yi Gao, Hui, Li, Yu Zhao, Yong Pei, <u>Zhongfang Chen</u>, Xiao Cheng Zeng <i>J. Am. Chem. Soc.</i> 2013, 135, 9336–19346.</p> <p>6 Metallic VS₂ Monolayer: A Promising 2D Anode Material for Lithium Ion Batteries Yu Jing, Zhen Zhou,* Carlos R. Cabrera, <u>Zhongfang Chen*</u> <i>J. Phys. Chem. C</i>. 2013, 117, 25409–25413. Highlighted by http://www.nanowerk.com/spotlight/spotid=33515.php</p> <p>5 Computational Quest for Spherical C₁₂B₆₈ Fullerenes with "Magic" π-electrons Tetra-coordinated Carbon Fengyu Li, De-en Jiang, <u>Zhongfang Chen*</u> <i>J. Mol. Mod.</i> 2013, accepted</p> <p>4 A Density Functional Theory Study of the Mechanical Properties of Graphane Corrections Qing Peng, <u>Zhongfang Chen</u>, Suvranu De <i>Mechanics of Advanced Materials and Structures</i>, 2013, DOI: 10.1080/15376469.2013.821111</p> <p>3 Preserving the Edge Magnetism of Zigzag Graphene Nanoribbons by Ethylene Termination Yafei Li, Zhen Zhou, Carlos R. Cabrera, <u>Zhongfang Chen*</u></p>		
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				<p><i>Scientific Reports</i>, 2013, <i>3</i>, 2030.</p> <p>Highlighted by www.nanowerk.com (http://www.nanowerk.com/spotlight/spotid=31128.php)</p> <p>2 Band Gap Engineering of BN sheet by Interlayer Dihydrogen Bonding and Electric Field Control Qing Tang, <u>Zhen Zhou</u>,* Panwen Shen, <u>Zhongfang Chen</u> <i>ChemPhysChem</i> 2013, <i>14</i>, 1787-1792.</p> <p>1 “Benzation” of graphene upon addition of monovalent chemical species† Ivan A. Popov, Yafei Li, <u>Zhongfang Chen</u>, Alexander I. Boldyrev <i>Phys. Chem. Chem. Phys.</i> 2013, <i>15</i>, 6842-6848.</p> <p>Grants</p> <ul style="list-style-type: none">➤ Team Member, Institute for Functional Nanomaterials (IFN), NSF, \$ 24 M, 08/01/2010-07/31/2015.➤ Team Member, <i>Collaborative Research: Cyberinfrastructure-enabled Computational Nanoscience for Energy Technologies</i> , NSF (EPS 1010094), \$ 2.7M, 10/15/2010-09/30/2014.➤ PI, <i>Theory-guided Innovation of Noncarbon Two-dimensional Nanomaterials</i>, DoD (W911NF-12-1-0083), \$ 420,000 (02/14/2012-01/31/2016)➤ PI, <i>Developing Holey Graphene Nanosheets and their Nanocomposites Towards High Performance Energy Storage</i>, NASA SEED Program, \$ 15,000, 06/01/2013-12/01/2014.➤ PI, <i>A Computational Quest for Highly Efficient and Low Cost Syngas-Ethanol Conversion Catalysts</i>, FIPI, \$11,200 and a RA support for two years, 08/2013-05/2015 <p>Supervised 2 undergraduate students, 6 graduate students, and 1 postdoc.</p>		
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Carlos Torres		3	Coordinación Q. 4043	<p>Se incorporó una experiencia al experimento con LASER de Estudio Cinético de los Estados Excitados en Pireno. En este experimento al estudiante se expone al uso de la técnica de espectrofotometría cinética con LASER, al manejo y uso adecuado de un osciloscopio digital y al análisis de data cinética. Los datos cinéticos se a decaimientos exponenciales de uno o dos componentes utilizando el programa SOLVER. A esta experiencia se le incorpora hacer un estudio previo en el que el estudiante analice los espectros de fluorescencia de las muestras a estudiar de modo que determine las regiones espectrales más adecuadas para el posterior estudio cinético con LASER. El análisis preliminar de la manera en que los estudiantes enfrentan este experimento al compararse con la manera hecha en semestres anteriores nos evidencia que logran un mejor entendimiento de esta actividad experimental.</p> <p>Durante el primer semestre del 2013-2014 se incorporaron modificaciones al experimento de Termodinámica de una Celda Electroquímica. Las mismas incluyen encontrar la mejor reacción redox que sea fácil de trabajar y de rastrear. Trabajamos con varios problemas de puente salino e incluimos cálculos de actividad.</p> <p>De igual forma se adquirieron otros equipos que permiten la colección digitales de datos, sustituyendo algunos de los equipos existentes.</p> <p>Otra tarea realizada el primer semestre consistió en coleccionar data del aprendizaje de los estudiantes de Química General en un ejercicio de laboratorio sobre Química Computacional. Parte de estos resultados se van a presentar durante el mes de agosto 2014 en la Bienal de Educación en Química a celebrarse en Allendale, Michigan.</p>		
Francisco Echegaray		3	Coordinación Curso Q 3001- PSI	<ol style="list-style-type: none"> 1. Preparar el calendario sugerido para la aprobación de pruebas, horarios de reposición por días feriados, etc., cónsono con el calendario académico oficial. 2. Preparar y enviar un informe semanalmente a los 4 profesores del curso sobre el progreso de los estudiantes en la aprobación de las unidades y además de dar sugerencias sobre posibles objetivos a ser discutidos en las sesiones semanales que tiene cada grupo con su profesor. 3. Preparar un examen de mitad de semestre (Examen de Integración) a partir de preguntas sometidas por los profesores. Esto requirió seleccionar, editar y preparar borrador, reunir a los profesores para revisar el borrador. Hacer la edición final y enviar a reproducir. 		

				<p>4. Administrar el Examen de Integración y coordinar los tutores para ayudar a velar durante el examen.</p> <p>5. Preparación de Examen final para el curso QUIM 3001, junto a la coordinadora del curso en su versión original.</p> <p>6. Se revisó el banco de preguntas en varias unidades del curso de QUIM 3002, con anterioridad a la jubilación de la Sra. Migdalia Beltrán (Diciembre de 2013). El propósito de la revisión fue asegurar que todas las unidades del curso QUIM 3002 tenían 10 preguntas y que los objetivos estaban actualizados, y de acuerdo con los objetivos sistémicos UPR para el curso de QUIMICA GENERAL II</p>		
José A. Prieto		<p>5</p> <p>3</p>	<p>Investigación</p> <p>Supervisión facilidades RMN</p>	<p>Presentaciones-</p> <p>Non-aldol Approach for Polypropionate Construction: A Second-Generation Epoxide-based Methodology", <u>José A. Prieto</u>, Florida International University, Graduate Seminar Program, October 18, 2014, Miami, FL.</p> <p>"Non-aldol Approach for Polypropionate Construction: A Second-Generation Epoxide-based Methodology", <u>José A. Prieto</u>, University of South Florida, Graduate, Graduate Seminar Program, Tallahassee, FL.</p> <p>"Epoxide-based methodology for the synthesis of polypropionates", <u>Alejandra Cruz-Montañez</u>, Jeishla L. Meléndez-Matos and José A. Prieto, 43rd National Organic Chemistry Symposium, June 23-27, 2013, University of Washington, Seattle, WA.</p> <p>Supervised 3 undergraduate students, 3 graduate students, and 1 postdoc.</p> <p>1) Se continuó dando servicio a los usuarios del Departamento de Química y la Facultad Ciencias Naturales.</p> <p>2) Se continuó con el entrenamiento de estudiante graduados, subgraduado y post-doctor</p> <p>3) Se continuó proveyendo el mantenimiento de los equipos incluyendo la administración semanal de los criogénicos.</p> <p>4) Se le dio servicio a la industria vía el Centro de Caracterización de Materiales (MCC).</p> <p>5) Procesó una orden de compras para adquisición de un espectrómetro de resonancia</p>		

				magnética nuclear para el Nuevo Edificio de Ciencias Moleculares de la UPR.		
Kai Griebenow		6	Investigación	<p>Publicaciones</p> <p>Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. <i>Mol. Pharm.</i> 11(1):102-11. PMID: PMC390532.</p> <p>Presentaciones</p> <ol style="list-style-type: none"> 1. <i>Griselle Hernández-Cancel</i>, Damaris Suazo, Johnsue Medina-Guzmán, María Rosado-González, Liz Díaz, and Kai Griebenow. Use of glycosylated horseradish peroxidase to improve the stability of an amperometric enzyme-based biosensor. 2nd International Conference and Exhibition on Biosensors & Bioelectronics; Chicago, IL, June 2013 (Received a price for poster.) 2. <i>Moraima Morales-Cruz</i>, Cindy Figueroa, Tania Gonzalez, Anna Molina, Yamixa Delgado, and Kai Griebenow (2013) Activation of caspase-dependent apoptosis by intracellular delivery of tumor-targeted cytochrome c-based nanoparticles. 1st PR Cell Signaling Conference, San Juan, November 9, 2013. 3. <i>Manoj Saxena</i>, Josell Ramirez, and Kai Griebenow (2013) Functional and biophysical study of recombinant cytochrome c variants for potential drug use. 1st PR Cell Signaling Conference, San Juan, November 9, 2013. 4. <i>Yamixa Delgado</i>, José Hernández, and Kai Griebenow (2013) Development of protein-fatty acid nanoparticles for tumor-selective delivery. 1st PR Cell Signaling Conference, San Juan, November 9, 2013. 5. <i>Nicole M. Del Toro Pagán</i>; Kai Griebenow, Ph.D.; and Miraida Pagán, (2013) Lactate Oxidase Biosensor: A Sensor to Determine the Physical Fitness of Astronauts. ABRCMS Conference Nov. 13-16, Nashville, TN. 6. <i>Yamixa Delgado</i>, José Hernández, Kai Griebenow (2013) Development of protein-fatty acid nanoparticles for tumor-selective delivery. The 12th US-Japan Symposium on Drug Delivery Systems Conference, Lahaina, Maui, Hawaii, Monday, December 16 to Friday, December 20, 2013. 7. <i>Cindy M. Figueroa</i>, Bethzaida N. Suarez, Jessica Mendez, Moraima Morales, 		

		3	Director of the UPR Research Center of Excellence in Renewable Energy	<p>Yamixa Delgado and Kai Griebenow (2013) Delivery of chemically glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. The 12th US-Japan Symposium on Drug Delivery Systems Conference, Lahaina, Maui, Hawaii, Monday, December 16 to Friday, December 20, 2013</p> <p>Protein Stabilization by Glycosylation in Stimulus-Responsive Controlled Release Systems for Intracellular Delivery, University of Michigan in Ann Arbor, College of Pharmacy, October 2, 2013.</p> <p>Supervised 8 undergraduate students and 12 graduate students.</p> <p>Directed the program</p>		
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Formulario R2

Facultad de Ciencias Naturales

Firma del Decano o Director: Dra. Nadia Cordero

Departamento de Ciencia de Química

Firma del Director del Departamento: Dr. Néstor M. Carballeira

SEGUNDO SEMESTRE DEL AÑO ACADÉMICO 2013-2014

Profesor (1)	Tipo Tarea (2)	Créditos Sust. (3)	Encomienda (4)	Labor Realizada (5)	Fecha Inicio (6)	Fecha Terminación (7)
Ana R. Guadalupe		4	Updating graduate courses	Course revision of Theory of Chemical Equilibria (Chem 6215) and Electroanalysis (Chem 8992) Revision of research literature to incorporate recent advances in the field. <ul style="list-style-type: none">• Identification, revision and acquisition of recently published and classic textbooks to support course bibliography.• Preparation of lectures on Power Point to create a modular library for students to study for exams, qualifiers and for future reference.• Creation of courses DropBox for student's access to electronic materials.• Beginning the incorporation of Excel for solving complex equilibria problems to create dynamic problem solving modular lectures.• Preparation of rubrics for the evaluation of students' course in Electroanalysis (Chem 8992).		
		6	Research	Submitted publication Electrochemical Studies of Positively-charged and Redox Active Copolymers of Poly(vinylferrocene-co-4-vinylpyridine) and Their Interaction with Calf-Thymus DNA Biomacromolecules, November 2013.		

				<p>Student presentations</p> <p>May 2014 – Enríquez González, Yanira; Rivera, Uriel; López, Andrea; Navarreto, Mónica; Díaz, Madeline, Ph.D.; Guadalupe Ana R., Ph.D.. NSF-PREM 8th Symposium: "Shape, Deformation, and Interaction Effects in Functional Soft Matter. <i>Electrochemical sensors for applications in human health</i>. Humacao, Puerto Rico.</p> <p>March 2014 - Rodríguez, Giovannie; Fajardo, Johanna; Enríquez, Yanira; Cedeño, Julio; Montes, Ingrid, Ph.D.; Guadalupe, Ana R., Ph.D. Lilly Academy Technical Forum. San Juan, Puerto Rico. <i>Ferrocenyl chalcones as precursors for potential biosensors</i> (co-author).</p> <p>March 2014 - Enríquez González, Yanira; Negrón, Yashira; Navarreto, Mónica; Gnadalupe, Ana R., Ph.D. 10th RISE Area Conference: "Current Development in Protein-Protein Interaction". <i>An electrochemical approach for the detection of an ADP-ribosylating Exotoxin A from Pseudomonas aeruginosa</i>. San Juan, Puerto Rico.</p> <p>March 2014 - Cedeño, Julio; Fajardo, Johanna; Rodríguez, Giovannie; Enríquez, Yanira; Montes, Ingrid, Ph.D.; Guadalupe, Ana R., Ph.D. 49th ACS Junior Technical Meeting, 34th Puerto Rico Interdisciplinary Scientific Meeting. <i>Ferrocenyl chalcones as potential precursors for ferrocene polymers</i> (co-author). Cayey, Puerto Rico.</p> <p>March 2014 - López, Andrea; Díaz, Madeline, PhD; Enríquez, Yanira; Guadalupe, Ana R., Ph.D. 49th ACS Junior Technical Meeting, 34th Puerto Rico Interdisciplinary Scientific Meeting. <i>Electrochemical detection of Salmonella's DNA hybridization using Fc-Imidazole</i>. Cayey, Puerto Rico.</p> <p>Supervised 3 undergraduate students and 3 graduate students.</p>		
Arthur Tinoco		7	Research	<p>Publications</p> <p>Parks, T.B.; Cruz, Y.M., Tinoco, A.D.* "Applying the Fe(III) binding property of a chemical transferrin mimetic to Ti(IV) anticancer drug design." <i>Inorg. Chem.</i>, 2014, 53, 1743-1749.</p>		

			<p>Presentations</p> <p>Citrate transport of titanium (IV) regulates the metal's bioactivity, June 2014, Gordon Conference on Metals in Medicine.</p> <p><i>Applying the Fe(III) Binding Property of a Chemical Transferrin Mimetic to Ti(IV) Anticancer Drug Design</i>, January 2014, Gordon Conference on Metals in Biology, Poster Presentation</p> <p>* I won the Carl Storm Underrepresented Minority (CSURM) Fellowship travel grant to attend this conference</p> <p><i>Regulation of the Bioactivity of Metals and Peptides through Protein Interactions and Insight into Drug Development</i>, March 2014, Oklahoma State University, Lecture</p> <p><i>A Bioinspired Drug Design Strategy for Titanium(IV)-Based Anticancer Compounds</i>, April 2014, University of Puerto Rico, Humacao, Lecture</p> <p><i>A Bioinspired Drug Design Strategy for Titanium(IV)-Based Anticancer Compounds</i>, May 2014, Southern Methodist University, Lecture</p> <p>Supervised 8 undergraduate students and 3 graduate students.</p> <p>Graduate seminar coordinator</p> <p>My responsibilities as a chemistry department seminar facilitator is to invite speakers to our weekly seminars, to host the speaker, to coordinate the speaker's schedule particularly meetings with other faculty and students, and to ensure that the speaker receives proper payment.</p> <p>As part of this job, I also coordinate all student seminar presentations. The student seminar is part of the graduate program requirements. My job here is to make sure the students are aware of the requirements of the seminar, to address any doubts that they may have, to schedule their seminars, and to collect all grades submitted by the faculty for the seminar presentation to assemble a final grade document.</p>		
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Abimael D. Rodríguez		7	Research	<p>Publications</p> <p>Figueroa, J, Vera, B, Rodríguez, AD. Pintoxolanes A–C, Highly Functionalized 3,14-Oxa-bridged Cembranoids from the Caribbean Gorgonian Coral Eunicea pinta. <i>Helv Chim Acta</i> 2014; 97, 712-721.</p> <p>Jiménez-Romero, C, Mayer, AMS, Rodríguez, AD. Dactyloditerpenol Acetate, a New Prenylbisabolane-Type Diterpene from <i>Aplysia dactylomela</i> with Significant In Vitro Anti-Neuroinflammatory Activity. <i>Bioorg Med Chem Lett</i> 2014; 24: 344-348.</p> <p>Presentations</p> <p>Isolation and Structure of Biselisabethoxanes A–E, A Rare Family of Bisditerpenes from <i>Pseudopterogorgia elisabethae</i>”, XI International Interdisciplinary Science & Technology Meeting, June 11–14, 2014, Santo Domingo, Republica Dominicana.</p> <p>Supervised 4 undergraduate students, 3 graduate students, and 2 postdoctoral fellows.</p>		
Brad Weiner		6	Research	<p>Publications</p> <ol style="list-style-type: none"> 1. Dionne M. Hernández, Frank Mendoza, Emmanuel Febus, Brad R. Weiner, and Gerardo Morell, “<i>Binder Free SnO₂-CNT Composite as Anode Materials for Li- ion Batteries</i>”, <i>J. Nanotechnology</i>, 2014, 381273. DOI: 10.1155/2014/381273. 2. José I López-Pérez, Edwin Ortiz-Quiles, Khaled Habiba, Mariel Jiménez-Rodríguez, Brad R. Weiner and Gerardo Morell, “Enhanced Structural Integrity and Electrochemical Performance of AlPO₄-coated MoO₂ Anode Material for Lithium-ion Batteries” <i>ISRN Electrochemistry</i> 2014,. 359019. DOI: 10.1155/2014/359019. 		

				<p>3. Juan Beltran-Huarac, Oscar Resto, Jennifer Carpeña-Núñez, Wojciech M. Jadwisieniczak, Luis F. Fonseca, Brad R. Weiner and Gerardo Morell, “<i>Single Crystal γ-MnS Nanowires Conformally Coated with Carbon</i>”, ACS Appl. Mat. and Interfaces 2014, 6(2), 1180-1186. DOI: 10.1021/am404746k.</p> <p>4. Deepak Varshney, Javier Palomino, Jennifer Gil, Oscar Resto, Brad R. Weiner and Gerardo Morell, “<i>New Route to the Fabrication of Nanocrystalline Diamond Films</i>”, J. Appl. Phys.2014, 115, 054304. DOI: 10.1063/1.4863822.</p> <p>5. Frank Mendoza, Dionne M. Hernández, Vladimir Makarov, Emmanuel Febus, Brad R. Weiner, and Gerardo Morell, “<i>Room Temperature Gas Sensor Based on Tin Dioxide-Carbon Nanotubes Composite Films</i>”, Sensors & Actuators: B. Chemical, 2014, 190, 227-233. DOI: 10.1016/j.snb.2013.08.050</p> <p>Grants</p> <p>Maximizing Yield Through Integration (MYTI): Science and Math Education in the Context of a Disposing Society”, Brad R. Weiner (co-P.I. with 4 others, P.I. Ana R. Guadalupe), National Science Foundation-I3. Funded: \$1,250,000 for 9/30/11-9/29/16.</p> <p>Supervised 5 undergraduate students, 6 graduate students, and 1 postdoctoral fellow.</p>		
Carlos Cabrera		4	Research	<p>Publications</p> <p>1. Zhou, Y.; Menéndez; C.L.; Guinel, M.J.; Needels; E.C.; González-González, I.; Jackson, D.; Lawrence, N.J.; Cabrera, C.R.; Ph.D.; Cheung, C.L., “Influence of nanostructured ceria support on platinum nanoparticles for alkaline methanol Electrooxidation”, <i>RCS Advances</i> 2014, 4 (3), 1270-1275.</p>		

				<ol style="list-style-type: none"> 2. Nicolau, E.; Fonseca, J.; Rodríguez-Martínez, J.; Richardson, Tra-My; Flynn, M.; Griebenow, K.; Cabrera, C.R., "Evaluation of an externally interfaced forward osmosis and bio-electrochemical system for energy recovery and wastewater reclamation", <i>ACS Sustainable Chemistry & Engineering</i> 2014, 2 (4), 749–754. 3. Cunci, Lisandro; Vélez, Carlos A.; Pérez, Ivan; Suleiman, Amal; Larios, Eduardo; Jose-Yacaman, Miguel; Watkins, James J.; Cabrera, Carlos R., "Platinum Electrodeposition at Unsupported Electrochemically Reduced Nanographene Oxide for Ammonia Oxidation", <i>ACS Materials and Interfaces</i>, 2014, 6 (3), pp 2137–2145. DOI: 10.1021/am4052552. 4. Ortiz-Quiles, E.; Soler, J.; Gobet, M.; Nosach, T.; García-Ricard, O.; Hernandez-Maldonado, A.; Greenbaum, S.; West, W.; Cabrera, C.R., "LiCl Molten Flux Synthesis of Layered-Layered Composite Li_2MnO_3- LiMO_2 (M= Mn, Ni, Co) Li-ion Battery Cathode Materials", <i>RCS Advances</i> 2014, 4, 12018-12027. DOI: 10.1039/C3RA47344A. 5. Martínez-Rodríguez, Roberto; Vidal-Iglesias, Francisco; Solla-Gullon, Jose; Cabrera, Carlos; Feliu, Juan, "Synthesis of Pt nanoparticles in water-in-oil microemulsion: on the effect of HCl on their surface structure", <i>J. Am. Chem. Soc.</i> 2014, 136 (4), 1280–1283. DOI: 10.1021/ja411939d. 6. Díaz Ayala, R.; Arroyo-Ramírez, L.; Raptis, RG, Cabrera, CR, "Thermal and Surface Analysis of Palladium Pyrazolate Molecular Precursors", <i>Journal of Thermal Analysis and Calorimetry</i>, 2014, 115(1), pp 479-488. 7. Yu Jing, Zhen Zhou, Carlos Raul Cabrera and Zhongfang Chen, Graphene, Inorganic Graphene Analogs and Their Composites for Lithium Ion Batteries, <i>J. Mater. Chem. A</i>, 2014, Accepted Manuscript. DOI: 10.1039/C4TA01033G 8. Roberto A. Martínez-Rodríguez, Francisco J Vidal-Iglesias, José Solla-Gullón, Carlos R Cabrera, Juan M Feliu, "Synthesis and Electrocatalytic Properties of H_2SO_4-Induced (100) Pt Nanoparticles Prepared in Water-in-Oil Microemulsion", <i>ChemPhysChem</i>, 2014, in press. 	
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				<p>9. Corchado, J.; Cabrera, C.R., "Ethylene Glycol Oxidation at Pt/TiO₂/Carbon Hybrid Catalysts Modified Glassy Carbon Electrodes in Alkaline Media", <i>Electrocatalysis</i>, 2014, in press. DOI: 10.1007/s12678-014-0207-0</p> <p>Presentations</p> <ol style="list-style-type: none"> 1. "Invited Presentation: Platinum Electrodeposition at Unsupported Electrochemically Reduced Nanographene Oxide for Ammonia Oxidation", 2014 Electrochemical Conference on Energy & the Environment (ECEE-March 13-16, 2014), Shanghai, China 2. "Bioelectrochemistry of Urea to Ammonia for Energy Recovery and Wastewater Reclamation", 2014 Electrochemical Conference on Energy & the Environment (ECEE-March 13-16, 2014), Shanghai, China. 3. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", University of Shanghai for Science and Technology, Shanghai, China, March 2014 4. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China, March 2014 5. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", Nankai University, Tainjin, China, March 2014 6. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", Hebei University of Technology, Tainjin, China, March 2014 7. "Nanostructured Electrochemical Interfaces: From Li-ion Battery Anodes to Synthesis of Fuel Cell Catalyst/Support Systems", Chinese Academy of Sciences, Beijing, China, March 2014. 		
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				<p>5. Redactar cartas para informar a los estudiantes los resultados de los exámenes de grado, cartas dirigidas a la Oficina del Registrador informando cambios en el estatus de los estudiantes.</p> <p>6. Evaluación de los expedientes académicos para determinar el progreso de los estudiantes.</p> <p>7. Ofrecer talleres de cómo redactar las propuestas de los estudiantes.</p> <p>8. A cargo de los cursos de investigación de todos los estudiantes del Programa.</p> <p>Service</p> <p>Miembro del Comité Asesor del Congreso Internacional Interdisciplinario de Investigación Científica, Republica Dominicana (2005 - present)</p>		
Ingrid Montes		3	Research	<p>Publications</p> <p>Myrna Otaño, Kennett Rivero and Ingrid Montes "(E)-1-Ferrocenyl-3-(2-methoxyphenyl)prop-2-en-1-one" Acta Cryst., 2014, E70, m108–m109.</p> <p>Presentations</p> <p>Synthesis and characterization of 3-(4-hydroxy-3-methoxyphenyl)ferrocenyl chalcones" <u>Josué Rivera-Hernández</u>; Myrna Otaño-Vega; María García; David Sanabria-Ríos, Ph.D.; Y. Rivera-Torres; R.Gutierrez-García; Ana Guadalupe, Ph.D.; Ingrid Montes, Ph.D.</p> <p>"1,1'-Ferrocenyl chalcones derivatives: synthesis, characterization and electrochemical properties of potential biological active compounds" <u>Ingrid Lehman Andino</u>, Myrna R. Otano Vega, Ingrid Montes González, Ph. D, 247 th ACS National Meeting, Dallas, TX, March 2014.</p> <p>"Chemistry Ambassadors for Climate Science: a successful non-formal education program" <u>María Rodríguez Guzman</u>, Alba González, Joel Pérez, Ingrid Montes González, 247 th ACS National Meeting, Dallas, TX, March 2014.</p>		

				<p>“University of Puerto Rico - Río Piedras Campus: Leading an ongoing trajectory of impact” <u>Adolfo Barragán Cabrera</u>; Raúl E. Martínez Quiñones; Edmarie Santiago Aponte; Ingrid Montes González; 247 th ACS National Meeting, Dallas, TX, March 2014.</p> <p>“Ferrocenyl chalcones framework: Leading the synthesis of biological active compounds” <u>Juan C. Aponte-Santini</u>, and Ingrid Montes-González, 247 th ACS National Meeting, Dallas, TX, March 2014.</p> <p>“Synthesis of the Ferrocenyl Stilbene Derivatives” <u>Sara M. Delgado-Rivera</u>; Giovanni Rodríguez, and Ingrid Montes-González, Ph.D, 247 th ACS National Meeting, Dallas, TX, March 2014.</p> <p>“Synthesis, Characterization, and Potential Applications of Ferrocenyl Chalcones Derivatives from 1, 1’-Diacetylferrocene” <u>Ingrid Lehman Andino</u>, Myrna R. Otano Vega, Naishka E. Caldero Rodríguez, Ingrid Montes González, 49th ACS Junior Technical Meeting, University of Puerto Rico, University of Puerto Rico-Cayey Campus, Cayey Puerto Rico, March 2014.</p> <p>“Solvent free stereoselective reduction of cyclohexanone derivatives: an investigative approach for the undergraduate organic chemistry laboratory” <u>Emmanuel López-Nogueras</u>; Sara M.; Delgado-Rivera; David Sanabria and Ingrid Montes-González, 49th ACS Junior Technical Meeting, University of Puerto Rico, University of Puerto Rico-Cayey Campus, Cayey Puerto Rico, March 2014.</p> <p>“Synthesis and characterization of Curcumin analogue” <u>Josué Rivera Hernández</u>, Myrna R. Otano Vega, María del Mar García, David Sanabria-Ríos, Ph. D., Ana R. Guadalupe, Ph. D., Ingrid Montes, Ph. D., 49th ACS Junior Technical Meeting, University of Puerto Rico, University of Puerto Rico-Cayey Campus, Cayey Puerto Rico, March 2014.</p> <p>“Chemistry Ambassadors for Climate Science: a successful non-formal education program” <u>María Rodríguez Guzmán</u>, Ingrid Montes González, 49th ACS Junior Technical Meeting, University of Puerto Rico, University of Puerto Rico-Cayey</p>		
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		3	Vicepresidencia	<p>Campus, Cayey Puerto Rico, March 2014.</p> <p>“Ferrocenyl Chalcones as potential precursors for Ferrocene Polymers” <u>Julio Cedeño</u>, Johanna Fajardo, Ingrid Montes, Ph.D., Ana Guadalupe, Ph.D., 49th ACS Junior Technical Meeting, University of Puerto Rico, University of Puerto Rico-Cayey Campus, Cayey Puerto Rico, March 2014.</p> <p>Supervised 20 undergraduate students and 4 graduate students.</p> <p>Outreach Director-at-Large, Board of Directors-American Chemical Society Chair Long Range Planning Committee Division of Chemical Education of the American Chemical Society. Member of the Editorial Advisory Board, Journal of Chemical Education. Peer Reviewer: Journal of Chemical Educator and Journal of Chemical Education Development and implementation of "Festival de Quimica" an International ACS outreach program. Faculty Advisor-ACS-UPR-RP Student Chapter</p> <p>Community service in Puerto Rico NCW Coordinator-ACS Puerto Rico Section CCED Coordinator-ACS Puerto Rico Section Project SEED Coordinator- ACS Puerto Rico Section Visit schools and work chemical demonstrations Coach High school students (Chem Clubs)</p> <p>Appointed by UPR President, Chair of the UPR Systemic Committee for improvement of the UPR Chemistry Program</p>		
Jorge Colón		3	Research	<p>Publications</p> <p>“Direct Intercalation of Cisplatin into Zirconium Phosphate Nanoplatelets for Potential Cancer Nanotherapy”, Agustín Díaz, Riviam J. Pérez, Amanda David, Millie L. González, Adriana Báez Tiffany B. Kinnibrugh, Paul Zhang, Abraham</p>		

			<p>Clearfield, and Jorge L. Colón, <i>Nanoscale</i> 2013, 5, 11456-11463.</p> <p>Presentations</p> <ol style="list-style-type: none"> 1. (Invited) “Taller de Construcción de Celda Solar de TiO₂ Sensibilizada por Tinte”, Colegio de Químicos de Puerto Rico, San Juan, January, 2014. 2. (Invited) “Artificial Photosynthesis, Amperometric Biosensors, and Drug Delivery Using Layered Structured Nanomaterials”, University of Puerto Rico at Cayey, April 2014. 3. (Invited) “Artificial Photosynthesis, Amperometric Biosensors, and Drug Delivery Using Layered Structured Nanomaterials”, University of Nantes, France, June 2014. <p>Student Presentations</p> <ol style="list-style-type: none"> 1. Natcha Vicente; Barbara Casañas-Montes; José Agosto; Jorge L. Colón. CBZ-Intercalated ZrP Nanomaterials. ACS-JTM/PRISM 2014, UPR-Cayey, 29/03/2014, Oral presentation. 2. Martínez, Francisco; Casañas-Montes, Bárbara; Montes, Ingrid; Colón, Jorge L. Intercalation of a ferrocene derivative into ZrP layered nanomaterial for potential biomedical applications. ACS-JTM/PRISM 2014, UPR-Cayey, 29/03/2014, Oral presentation. 3. Bianca M. Torres; Barbara Casañas-Montes, Yanira Enríquez, Ingrid Montes, Ana R. Guadalupe and Jorge L. Colón. Electrochemical characterization of ferrocene derivatives intercalated into zirconium phosphate layers. ACS-JTM/PRISM 2014, UPR-Cayey, 29/03/2014, Oral presentation. 4. Mario Ramos Garcés, Mercado-Feliciano, Samirah; Ortiz-Quiles, Edwin O.’ Vargas Santiago, Jennifer; Casañas, Barbara; Torres-González, Lisa A.; García-Irene, Ismael A.; Arbelo-López, Héctor D.; Rodríguez Mackensie, Angel D.; López-Garriga, Juan, Motta, Noel; Cabrera, Carlos R.; Colón, Jorge L., Solar Energy Outreach: The 		
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				<p>Caribbean Brigade of the CCI Solar Army, ACS-JTM/PRISM 2014, UPR-Cayey, 29/03/2014, Oral presentation.</p> <p>5. Julissa González; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; Colón, Jorge. Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles, ACS-Senior Technical Meeting, UPR-Cayey, March 2014, Poster presentation.</p> <p>6. Bianca M. Torres; Casañas, Barbara; Enriquez, Yanira; Montes, Ingrid; Guadalupe, Ana R.; Colón, Jorge, Electrochemical characterization of ferrocene derivatives intercalated into zirconium phosphate layers, 34th Annual Research and Education Forum, UPR-Recinto de Ciencias Médicas, April 2014. Poster presentation.</p> <p>7. Natcha Vicente López; Barbara Casañas-Montes; José Agosto; Jorge L. Colón. Novel CBZ-Intercalated ZrP Nanomaterials. 34th Annual Research and Education Forum, UPR-Recinto de Ciencias Médicas, April 2014, Poster presentation.</p> <p>8. Julissa González; Díaz, Agustín; Casañas, Barbara; González, Millie; Báez, Adriana; Clearfield, Abraham; Colón, Jorge. Intercalation of Anticancer Drugs Based on Anthracycline Antibiotics in Zirconium Phosphate Nanoparticles, 34th Annual Research and Education Forum, UPR-Recinto de Ciencias Médicas, April 2014, Poster presentation.</p> <p>9. Barbara Casañas-Montes; Clémence Queffelec; Bruno Bujoli and Jorge L. Colón. Metallocene dichlorides intercalation into zirconium phosphate for potential cancer nanotherapy. JED: Journées de l'Ecole Doctorale 2014, Nantes University, France, 16-17/04/2014, Oral Presentation.</p> <p>Supervised 6 undergraduate students and 3 graduate students.</p> <p>Grants</p> <p>Caribbean Brigade of the CCI Solar Army, subaward del Centro de Innovación Química del Instituto Californiano de Tecnología, subvencionado por NSF. \$40,000. February 14, 2014-September 30, 2014..</p>		
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José M. Rivera		7	Research	<p>Publications</p> <p>Martín-Hidalgo, M.; García-Arriaga, M.; González, F.; Rivera, J. M. "Tuning supramolecular G-quadruplexes with mono- and divalent cations" <i>Supramol. Chem.</i> 26, [Epub ahead of print] (2014). DOI:10.1080/10610278.2014.924626</p> <p>Presentations</p> <p>Posters (Graduate students)</p> <p>Luxene Belfleur, José M. Rivera 'Development of Supramolecular G-quadruplexes Self-Assembled Receptors for G-quadruplex DNA' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Poster)</p> <p>María del C. Rivera-Sánchez, Ana V. Morales-de-Echegaray, Marilyn García-Arriaga, Gerard Hobley; José M. Rivera 'Development of self-assembled ligands for G-quadruplex DNA based on 8- aryl-2'-deoxyguanosine derivatives' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Poster)</p> <p>Luis M. Negrón; Loruhamá Delgado; José M. Rivera 'Structural Characterization of Supramolecular Hacky Sacks' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Poster)</p> <p>Luis A. Prieto Costas; José M. Rivera 'Sugar Responsive Supramolecular G-Quadruplexes: Initial studies of a glucose responsive system' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Poster)</p> <p>Oral (Undergraduate students)</p> <p>Loruhamá M. Delgado Rivera; Luis M. Negrón; José M. Rivera 'Encapsulation and Controlled Release Characteristics of Supramolecular Hacky Sacks' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Oral)</p>		
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				<p>Diómedes Dieppa, Luis Negrón, Loruhamá Delgado; José M. Rivera 'Evaluation of the porosity of supramolecular hacky sacks using Dextran-Texas Red Conjugates' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Oral)</p> <p>Joyce A. Rivera; Luis M. Negrón; José M. Rivera 'Studies of Protein Encapsulation in Supramolecular Hacky Sacks' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Oral)</p> <p>Eveliz M. Peguero-Pereira; Loruhamá Delgado; Luis M. Negrón; José M. Rivera 'Gene Encapsulation in Supramolecular Hacky Sacks' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Oral)</p> <p>Yanira Rodríguez; Luis A. Prieto; José M. Rivera 'Design, Synthesis, and Self-Assembly Studies of Glucose Responsive Supramolecular G-Quadruplexes' Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting, March 29th, 2014, Cayey (Oral)</p> <p>"Hierarchical Functional Assemblies Based on Supramolecular G-quadruplexes" Symposium dedicated to Dr. Alfonso Romo de Vivar, Instituto de Química, Universidad Nacional Autónoma de México, Ciudad México; January 24-27, 2014. [Invited]</p> <p>Supervised 6 undergraduate students and 6 graduate students.</p>		
John Soderquist		7	research	<p>Publications</p> <p>Soderquist, John; Gonzalez, Javier "(E)-2-Boryl-1,3-dienes from the 10-TMS-9-BBDs: Highly Selective Reagents for the Asymmetric Synthesis of anti-α,β-Disubstituted-β-allenylamines from the Allylboration of Aldimines", Organic Letters, <i>in press</i> 2014.</p>		

				<p>Presentations</p> <p><i>Sequential Asymmetric Conversions with the Amazing BBDs</i>, John A. Soderquist, Lorell Muñoz-Hernández, Eduvigis González, Eyleen Alicea, BORAM XIV, Rutgers University, Newark, NJ, June 19, 2014.</p> <p>Supervised 2 undergraduate students and 4 graduate students.</p>		
Lillian Bird		3	Mejoramiento de la enseñanza	<p>Durante este semestre se ofreció la prueba diagnóstica de literacia espacial a estudiantes de escuela superior, y se analizó y realizó las pruebas estadísticas a la misma. Una vez se tenga los resultados y los análisis estadísticos de los estudiantes de los estudiantes subgraduados, se compararán los resultados con los obtenidos para estudiantes de escuela superior y maestros de ciencias y matemáticas para luego proceder a publicar los resultados en una revista evaluada por pares.</p>		
		3	Coordinación de QUIM 3002 (Conferencia)	<p>La coordinación de este curso conlleva la actualización del prontuario del curso, la preparación del programa y el calendario del curso, la actualización de la página de Blackboard para todos los estudiantes del curso, la programación de fechas de exámenes parciales, la selección y solicitud de salones para esas fechas, la conducción de reuniones de coordinación, asignación de comités de examen, asignación de preguntas a profesores, reuniones con los comités de examen, preparación del examen, duplicación del examen para todas las secciones del curso (más de 650 estudiantes), preparación de la clave de cada examen, preparar los sobres de exámenes incluyendo las hojas de contestaciones, llevar los exámenes finales a ser corregidos en el DTAA, y la conducción de la reunión de curva.</p>		
Néstor Carballeira		3AH	Research	<p>Publications</p> <p>D. J. Sanabria-Ríos, Y. Rivera-Torres, G. Maldonado-Domínguez, I. Domínguez, C. Ríos, D. Díaz, J. W. Rodríguez, J. S. Altieri-Rivera, E. Ríos-Olivares, G. Cintrón, N.</p>		

				<p>Montano, and N. M. Carballeira “Antibacterial Activity of 2-Alkynoic Fatty Acids Against Multidrug Resistant Bacteria”, Chem. Phys. Lipids, 178, 84-91 (2014).</p> <p>D. Oyola-Robles, C. Rullán Lind, N. M. Carballeira, and A. Baerga Ortiz “Expression of Dehydratase Domains from a Polyunsaturated Fatty Acid Synthase Increases the Production of Fatty Acids in <i>Escherichia coli</i>”, Enzyme Microb. Tech., 55, 133-139 (2014).</p> <p>Presentations</p> <p>Carballeira, N. M. “The Medicinal Chemistry of the 2-Methoxylated Fatty Acids – from their Isolation and Synthesis to Protozoa and Cancer Cells”, The University of Texas at San Antonio, San Antonio, Texas, May 7, 2014.</p> <p>Carballeira, N. M., Montano, N., Adorno, C., Rodríguez, A. “Novel Methoxylated Phospholipid Fatty Acids from the Caribbean Sponge <i>Asteropus niger</i>”, 105th American Oil Chemists’ Society (AOCS) Annual Meeting & Expo, Henry B. González Convention Center, San Antonio, Texas, May 4-7, 2014.</p> <p>Marrero, W. O., Montano, N., and Carballeira, N. M. “First Total Synthesis of (±)-2-Methoxy-6Z-octadecenoic Acid, a Novel Fatty Acid from the Caribbean Sponge <i>Spheciospongia cuspidifera</i>, which Inhibits the <i>Leishmania donovani</i> DNA Topoisomerase IB Enzyme”, 49th Junior Technical Meeting, American Chemical Society, Puerto Rico Section & 34th Puerto Rico Interdisciplinary Scientific Meeting, University of Puerto Rico - Cayey, Cayey, Puerto Rico, March 29, 2014.</p> <p>Montano, N., Marrero, W.O., and Carballeira, N. M. “Synthesis of a New 2-Methoxylated Δ6 Unsaturated Fatty Acid with Potential Antiprotozoal and Anticancer Properties”, 247th American Chemical Society National Meeting & Exposition, Dallas, Texas, March 16-20, 2014.9, 2013.</p> <p>Supervised 3 undergraduate students and 4 graduate students.</p>		
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		12	Director Departamento de Química	Todas las labores inherentes al cargo.		
Noel Motta		6	Chemistry Department Academic Coordinator	<ul style="list-style-type: none"> - Responsible for all aspects of the registration process and course scheduling of the department. - Work with the department's faculty in course offerings, accreditation of new courses, course equivalency and counseling of students. - Participate in the College of Natural Sciences committees to implement new curriculum strategies. - Evaluate candidates for transfers and changes of majors. - Evaluate course content for course equivalency among UPR system, private institutions, community colleges and international institutions. - Update database and assist in the preparation of reports. - Work with the Graduate Program Coordinator in implementing effective strategies for course offerings, accreditation of courses, and counseling of graduate students. - Assist the Department Chair when necessary 		
		6	Chemistry Department Academic Advisor	<ul style="list-style-type: none"> - Provide counseling to all 481 chemistry majors on all aspects of the chemistry curriculum, including co-curricular activities such as community service participation, scientific research involvement and internship (from Universities, Government and private sectors) opportunities. - Evaluate senior students to certify fulfillment of graduation requirements. 		
Rosa Betancourt		3	Mejoras al Curso de Q. Orgánica II	Búsqueda y estudio de Literatura: Identifiqué y estudié publicaciones sobre los temas que enseñamos en Química Orgánica durante el primer y segundo semestre. Compartí y discutí datos relevantes con los profesores a cargo de enseñar el curso.		

		3	Coordinación Q. Orgánica II	<p>Mantenimiento Portales del Curso: Actualicé y mantuve los Portales del curso al día que incluye el programa del curso, los objetivos terminales, las guías de estudio, exámenes de años anteriores, portales relacionados con el curso, pruebas cortas, el programa del laboratorio, etc.</p> <p>Preparación Prontuarios Sistémicos: Preparé los prontuarios sistémicos de QUIM 3031 y QUIM 3032 en inglés y español. Además, preparé las descripciones de ambos cursos para el catálogo del Recinto.</p> <p>Manual: Trabajé en la Cuarta Edición del manual Aprendizaje Activo de la Química Orgánica- Parte II.</p> <p>Avalúo: Preparé, administré y resumí las evaluaciones del curso ambos semestres. Recogí datos que estamos analizando estadísticamente sobre la ejecutoria de los estudiantes en los objetivos terminales y cómo compara con la percepción que tienen de sus capacidades. También ausculté el sentir de los estudiantes sobre varios aspectos que podrían afectar su ejecutoria en el curso tales como las tutorías, los trabajos grupales y la relevancia que tienen algunos temas del curso.</p> <p>Demostraciones: Preparé demostraciones para los estudiantes del curso que toman sus clases en el salón CN 251.</p>		
Liz Díaz		3	Research	<p>Presentations</p> <p>Sofia B. Marrero Medina, Anibal Hernandez, Loretta Roberson and Liz M. Diaz-Vazquez. A Comparison of the Potential of Several Immobilized Macro-Algae Species for the Removal of Organic Pollutants from Water. 34rd Puerto Rico Interdisciplinary Scientific Meeting and 49th Junior Technical Meeting (JTM/PRISM 2014), University of Puerto Rico, Cayey Campus, Puerto Rico.</p> <p>Rojas-Pérez A and Díaz-Vázquez L.: “Catalytic upgrading of biofuels from macroalgae”. “A FEW ideas for the new millenium” (Food, Energy and Water), Abril 23 y 24 de 2014. University of Puerto Rico, Río Piedras Campus, San Juan, Puerto Rico.</p> <p>Rojas-Pérez A and Díaz-Vázquez L.:“Catalytic upgrading of biofuels from</p>		

		3	Coordinación Q.3002L	<p>macroalgae”. 4th International conference on algal biomass, biofuels and bioproducts, Junio 15-18 de 2014. Santa Fe Convention Center, New Mexico, USA.</p> <p>Díaz-Vázquez L.: “Challenges in the production of biofuels from macroalgae”. “A FEW ideas for the new millenium” (Food, Energy and Water), Abril 23 y 24 de 2014. University of Puerto Rico, Río Piedras Campus, San Juan, Puerto Rico.</p> <p>Díaz-Vázquez, L. Effective teaching strategies to introduce Nanotechnology and Enviromental Science Fundamentals in K-12 science courses. Resources Center, University of Puerto Rico, Rio Piedras Campus. June 2, 2014.</p> <p>Motta, Noel; Díaz Vázquez, Liz. Introducing Method Development through an active learning activity. Spelman College, Atlanta Georgia, June 28, 2014.</p> <p>Supervised 10 undergraduate students and 3 graduate students.</p> <ol style="list-style-type: none">1. Preparación del itinerario del semestre que requiere la coordinación con el programa de conferencias y la selección de los experimentos, reactivos y materiales a utilizarse.2. Coordiné con la Oficina de Coordinación de Laboratorios, el Cuarto de Soluciones y la Oficina de OPASO para que los reactivos y materiales estén disponibles en los laboratorios en el momento designado y que se disponga correctamente de los desperdicios.3. Reuní a los instructores de laboratorio de QUIM-3002L dos a tres horas por semana. En estas reuniones se discutieron en detalle la teoría y el procedimiento de cada experimento. Se ofrecieron demostraciones y se presentaron problemas con los que se podrían confrontar durante los experimentos. También se compartieron las experiencias que han tenido los instructores en cada experimento y luego de analizar las situaciones se recomendaron soluciones. Estas reuniones son vitales para el buen funcionamiento del curso.		
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				<p>4. Adiestre a los ayudantes de catedra en estrategias de enseñanza que promueve el aprendizaje activo e inquisitivo en el salón de clases.</p> <p>5. Coordine el quinto simposio de investigación del curso de química general.</p> <p>6. Evalúe a los Ayudantes de Cátedra. Esta evaluación se basa en la participación y asistencia a las reuniones de Coordinación, en su ejecutoria al preparar pruebas cortas y conducir los experimentos y en los resultados de la evaluación llevada a cabo por los estudiantes</p> <p>7. Preparación del examen final. Entrega de informe de notas de todos los estudiantes de QUIM-3002L a los profesores del curso.</p> <p>Curricular material</p> <p>Prontuarios de los siguientes cursos de laboratorio QUIM 3001L, QUIM3002I, QUIM4015L. QUIM 5995 Técnicas forenses.</p> <p>Desarrollo de 10 manuales y videos de operación para los siguientes instrumentos: FTIR, GCMS, HPLC, AA, Fluorimetro, UVVIS, potenciostato purificador de agua nanopura, extractor de fluido supercrítico y HTL</p> <p>Desarrollo de tres experiencias de laboratorio: determinación de aditivos de sabor en cigarrillos, Produccion y Caracterizacion de bioaceite a partir de macroalgas. Biosintesis de nanoparticulas de metales y su uso en celdas de combustible</p> <p>Desarrollo de rubricas para la evaluación de reportes de laboratorio y proyectos de investigación.</p>		
Rosa Flores		3	Coordinación de avalúo del aprendizaje estudiantil	<p>1. Participar de reuniones organizados por el Decanato de la Facultad de Ciencias Naturales del Recinto, para orientar a los Coordinadores de Avalúo del Aprendizaje Estudiantil en cuanto a las diversas funciones del cargo, y los diversos recursos de apoyo disponibles.</p> <p>2. Supervisar la implantación de los instrumentos de avalúo diseñados para medir el</p>		

				<p>aprendizaje estudiantil en los dominios enfocados en este año académico 2013-2014.</p> <p>3. Recibir la data de avalúo enviada por los profesores y ayudantes de cátedra de los cursos participantes, y llevar acabo el análisis de la misma, enfocando los objetivos del plan de avalúo.</p> <p>4. Redactar el Informe Anual de Avalúo del Aprendizaje Estudiantil para el año académico 2013-2014.</p> <p>5. Enviar la versión electrónica del Informe de Avalúo al Ayudante Académico del Programa de Química y al Decanato de la Facultad de Ciencias Naturales, para su referencia y distribución.</p> <p>6. Preparar una presentación en PowerPoint de los hallazgos del avalúo 2013-2014, y presentarla en la próxima reunión departamental</p> <p>Grants</p> <p>Proyecto realizado con fondos de una propuesta a Procter & Gamble (\$10,000) que se gestionó durante el año académico 2012-2013 en la UPR de Carolina.</p> <p><u>Metas:</u> Estudiar la bioquímica de ciertos productos de Procter & Gamble (P&G) disponibles en el mercado para tratar las manchas y las arrugas en la piel. Desarrollar el proyecto que los estudiantes realizarán en el curso de laboratorio Técnicas Bioquímicas (QUIM 4865) en el segundo semestre.</p>		
Zhongfang Chen		7	Research	<p>Presentations</p> <p>University of Chinese Academy of Science, Beijing, China College of Materials Science and Engineering, Hebei University of Technology, China Dept. of Materials Chemistry, Nankai University, Tianjin, China Changchun Institute of Applied Chemistry, Chinese Academy of Science, Changchun, China Shanghai University for Science and Technology, Shanghai, China Harbin Normal University, Harbin, China Nanoforum, Dalian University of Technology, Dalian, China</p>		

				<p>Journal articles</p> <p>Graphene, Inorganic Graphene Analogs and Their Composites for Lithium Ion Batteries Yu Jing, Zhen Zhou,* Carlos R. Cabrera, Zhongfang Chen* J. Mater. Chem. A. 2014, Accepted Highlighted as a cover picture</p> <p>Carbon Atoms Trapped in Cages: Metal Carbide Clusterfullerenes Peng Jin*, Chengchun Tang, Zhongfang Chen* Coord. Chem. Rev. 2014, 270-271, 89–111</p> <p>Al₂C Monolayer: The Planar Tetracoordinate Carbon Global Minimum Yafei Li, Yunlong Liao, Paul v. R. Schleyer, Zhongfang Chen* Nanoscale, 2014, accepted</p> <p>Why the Photocatalytic Activity of Mo-doped BiVO₄ Is Enhanced: a Comprehensive Density Functional Study Kaining Ding,* Bin Chen, Zhenxing Fang, Yongfan Zhang, Zhongfang Chen PCCP, 2014, accepted</p> <p>Be₂C Monolayer with Quasi-Planar Hexacoordinate Carbons: A Global Minimum Structure Yafei Li,* Yunlong Liao, Zhongfang Chen* Angew. Chem. Int. Ed. 2014, ASAP Highlighted as a cover picture</p> <p>Tuning Band Gaps of BN Nanosheets and Nanoribbons via Interfacial Dihalogen Bonding and External Electric Field Qing Tang, Jie Bao, Yafei Li, Zhen Zhou*, Zhongfang Chen* Nanoscale 2014, ASAP Highlighted as a cover picture</p> <p>Chemical Sharpening, Shortening, and Unzipping of Boron Nitride Nanotubes, Yunlong Liao, Zhongfang Chen*, John W. Connell*, Catharine C. Fay, Cheol Park, Jae-Woo Kim, and Yi Lin*Adv. Funct. Mater. 2014, ASAP, DOI: 10.1002/adfm.201400599Highlighted as a cover picture</p>		
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			<p>Comparative Density Functional Theory Study on the Electronic and Optical Properties of BiMO₄ (M= V, Nb, Ta) Kaining Ding, Bin Chen, Yulu Li, Yongfan Zhanga, and Zhongfang Chen J. Mater. Chem. A, 2014,2, 8294-8303.</p> <p>With the Same Clar Formulas, Do the Two-dimensional Sandwich Nanostructures X-Cr-X (X=C₄H, NC₃ and BC₃) Behave Similarly? Xin Tan, Peng Jin, Zhongfang Chen* Phys. Chem. Chem. Phys., 2014, 16, 6002-6011.</p> <p>Self-modulated Band Structure Engineering in C₄F Nanosheets: First-Principles Insights Yafei Li,* Bay Allen Pantoja, Zhongfang Chen* J. Chem. Theory Comput. 2014, 10, 1265-1271. Highlighted as a cover picture.</p> <p>Selectivity Trend of Gas Separation through Nanoporous Graphene Hongjun Liu, Zhongfang Chen, Sheng Dai, De-en Jiang J. Solid State Chem. 2014, accepted</p> <p>Tuning Electronic Properties of Germanane Layers by External Electric Field and Biaxial Tensile Strain: A Computational Study Yafei Li,* Zhongfang Chen* J. Phys. Chem. C, 2014, 118, 1148-1154.</p> <p>Synthetic and structural study on some new porphyrin or metalloporphyrin macrocycle-containing model complexes for the active site of [FeFe]-hydrogenases Li-Cheng Song,* Liang-Xing Wang, Chang-Gong Li, Fengyu Li, Zhongfang Chen* J. Organomet. Chem. 2014, 749, 120–128.</p> <p>Grants</p> <p>Team Member, Collaborative Research: Cyberinfrastructure-enabled Computational Nanoscience for Energy Technologies, NSF (EPS 1010094), \$ 2.7M, 10/15/2010-</p>		
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				<p>09/30/2014.</p> <p>Supervised 2 undergraduate students, 6 graduate students, and 1 postdoc.</p>		
Carlos Torres		3	Coordinación Q. 4043	<p>Se incorporó una experiencia al experimento con LASER de Estudio Cinético de los Estados Excitados en Pireno. En este experimento al estudiante se expone al uso de la técnica de espectrofotometría cinética con LASER, al manejo y uso adecuado de un osciloscopio digital y al análisis de data cinética. Los datos cinéticos se a decaimientos exponenciales de uno o dos componentes utilizando el programa SOLVER. A esta experiencia se le incorpora hacer un estudio previo en el que el estudiante analice los espectros de fluorescencia de las muestras a estudiar de modo que determine las regiones espectrales más adecuadas para el posterior estudio cinético con LASER. El análisis preliminar de la manera en que los estudiantes enfrentan este experimento al compararse con la manera hecha en semestres anteriores nos evidencia que logran un mejor entendimiento de esta actividad experimental.</p> <p>Durante estos dos semestres (2013-2014) me he dedicado a restablecer las investigaciones subgraduadas en el área de Educación en Química Computacional y poner en condiciones las computadoras y programas para el mismo. De igual forma he iniciado la búsqueda de estudiantes subgraduados que estén interesados en mis proyectos. Al momento he logrado reinstalar varios de los programas y actualizar las computadoras y aún estoy reclutando estudiantes. Sin embargo, en mayo del 2014 una situación ocurrida en HPCF destruyo todos los archivos y resguardos que se encontraban allí incluyendo casi todos mis cerca de 15,000 archivos de trabajo. Aunque es un trabajo enorme y parte de estos resultados (no los archivos originales) los tengo conmigo. Tendré que invertir tiempo el próximo semestre en rehacer los archivos más importantes, recuperando la instalación de WebMO con los programas que corrían dentro de esta plataforma.</p>		
Dalice Piñero		7	Research	<p>Para fines del mes de abril formé mi primer equipo de trabajo. Actualmente cuento con 11 estudiantessubgraduados para trabajar en mis dos proyectos. Comencé en el mismo mes de abril con las reuniones de grupo y preparé el material de cada una de ellas en lo</p>		

				<p>que mis estudiantes se preparan para presentar sus planes de trabajo. Además, he realizado una serie de talleres para preparar a mis estudiantes antes de que comiencen con sus proyectos de investigación. Los talleres ofrecidos llevaron como título:</p> <ol style="list-style-type: none"> 1) Anaerobic synthetic techniques: Schlenk and dry box use 2) Basic Spectroscopic techniques relevant to coordination complexes 3) Electrochemistry: sweeping methods 4) Crystal growth 5) Introduction to crystallography <p>También dediqué muchos de mis esfuerzos en lograr la reparación del instrumento de difracción de rayos X que se encuentra en el laboratorio FB-207 y que llevaba más de 10 meses dañado. El mismo se encuentra en estos momentos en funcionamiento y ya se han realizado varias estructuras cristalinas para investigadores del Recinto.</p> <p>Supervised 11 undergraduate students.</p> <p>Publications</p> <p>Switching off the SMM properties of the $[(\text{Co}(\text{Me}_6\text{TREN})(\text{OH}_2)]^{2+}$ module by complexation with $[\text{RuIII}(\text{salen})(\text{CN})_2]^-$, New Journal of Chemistry, Advanced Article. Submitted for publication.</p> <p>Grants</p> <p>Development of Molecular Magnets and Nanomaterials for applications in memory devices following a Rotationally-Oriented Ligand Design (ROLD) approach. FIPI</p>		
Francisco Echegaray		3	Coordinación, Administración	1. Preparar el calendario sugerido para la aprobación de pruebas, horarios de reposición por días feriados, etc., cónsono con el calendario académico oficial.		

			Salón de Exámenes de PSI	<p>2. Actualizar el prontuario del curso.</p> <p>3. Preparar y enviar un informe semanalmente a los 2 profesores del curso sobre el progreso de los estudiantes en la aprobación de las unidades y además de dar sugerencias sobre posibles objetivos a ser discutidos en las sesiones semanales que tiene cada grupo con su profesor.</p> <p>4. Preparar un examen de mitad de semestre (Examen de Integración) a partir de preguntas sometidas por los profesores. Esto requirió seleccionar, editar y preparar borrador, reunir a los profesores para revisar el borrador. Hacer la edición final y enviar a reproducir.</p> <p>5. Administrar el Examen de Integración y coordinar los tutores para ayudar a velar durante el examen.</p> <p>6. Preparación de Examen final para el curso QUIM 3001, junto a la coordinadora del curso en su versión original.</p> <p>7. Dado que la Sra. Migdalia Bertrán se retiró de su posición como administradora del Centro de Exámenes de PSI, este servidor asumió la mayor parte de las tareas que anteriormente realizaba la administradora para que se pudiera seguir ofreciendo la continuación del curso en formato PSI el segundo semestre del año 2013-14. Estas labores adicionales incluyeron.</p>		
José A. Prieto		4	Investigación	<p>Publicaciones</p> <p>"Regiocontrolled Ring Opening of Monoprotected 2,3-Epoxy-1,4-Diols by Using Alkynyl Aluminum Reagents: Synthesis of Differentially Monoprotected Alkynyl Triol Derivatives" J. A. Prieto,* J. Rentas Torres, R. Rodriguez-Berrios, <i>Synlett</i> 2014, 25, 433-437 (doi; 10.1055/s-0033-1340332).</p> <p>Supervised 5 undergraduate students, 3 graduate students, and 1 postdoc.</p>		
		3	Supervisión facilidades de RMN	<p>1) Se continuó dando servicio a los usuarios del Departamento de Química y la Facultad de Ciencias Naturales.</p> <p>2) Se continuó con el entrenamiento de estudiante graduados, subgraduado y post-doctoral.</p> <p>3) Se continuó proveyendo el mantenimiento de los equipos incluyendo la administración semanal de los criogénicos.</p> <p>4) Se le dio servicio a la industria vía el Centro de Caracterización de Materiales</p>		

				<p>(MCC).</p> <p>5) Se instaló un nuevo sistema de aire comprimido incluyendo plomería y compresor para finalmente resolver un problema de años en la facilidad.</p>		
Kai Griebenow		6	Investigación	<p>Publicaciones</p> <p>Yamixa Delgado, Moraima Morales-Cruz, José Hernández-Román, Yashira Martínez and Kai Griebenow (2014) Chemical glycosylation of cytochrome c improves physical and chemical protein stability. <i>BMC Biochemistry</i>, in press.</p> <p>Nicolau E, Fonseca, JF, Rodriguez Martinez JA, Richardson T-M, Flynn M, Griebenow K, Cabrera CR (2014) Evaluation of a urea bioelectrochemical system for wastewater treatment processes. <i>ACS Sustainable Chem. & Eng.</i> 2(4): 749-754.</p> <p>Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. <i>Mol. Pharm.</i> 11(1):102-11. PMID: PMC390532</p> <p>Presentaciones</p> <ol style="list-style-type: none"> 1. <i>Rohit Kumar Sharma</i>, M. Saxena, Kai Griebenow (2014) Formation of biodiesel from Caribbean macroalgae lipids by using lipase nanoparticles. 2nd DoD Site Visit, UPR-RP, Febr. 20, 2014 2. <i>Freisa M. Joaquín Ovalle</i>, Kai Griebenow (2014) Thylakoid Membrane Solubilization of <i>Botryococcus braunii</i> for the Isolation and Characterization of the Main Components of the Photosynthetic Apparatus. 2nd DoD Site Visit, UPR-RP, Febr. 20, 2014 3. <i>Manoj Saxena</i>, Josell Ramirez, and Kai Griebenow (2014) Functional and biophysical study of recombinant cytochrome c variants for potential drug use. PRISM 2014, March 29, UPR Cayey 4. <i>Johnsue Medina-Guzmán</i>, Griselle Hernández-Cancel, and Kai 		

				<p>Griebenow (2014) Use Of Glycosylated Horseradish Peroxidase To Improve The Stability Of An Amperometric Enzyme-Based Biosensor. PRISM 2014, March 29, 2014, UPR Cayey</p> <p>5. <i>Virginia Rojas</i>, Josell Ramirez, Manoj Saxena and Kai Griebenow (2014) Site-selective mutation of L-Asparaginase II: structure and activity characterization. PRISM 2014, March 29, UPR Cayey</p> <p>6. <i>Marimar Benitez</i>, Anna Molina Calzada, Kai Griebenow (2014) Protein-photosensitizer nanoparticles for the treatment of cancer. IVY Plus Symposium, Cambridge, MA, March 13-16, 2014.</p> <p>7. <i>Freisa M. Joaquín Ovalle</i>, Kai Griebenow (2014) Thylakoid Membrane Solubilization of <i>Botryococcus braunii</i> for the Isolation and Characterization of the Main Components of the Photosynthetic Apparatus. Young Algeers 2014, Mt. Pelier & Narbonne, April 3-5, 2014.</p> <p>8. Anna M. Molina, Moraima Morales-Cruz, Marimar Benítez, Kiara Berríos, Kai Griebenow (2014) Design of a stimulus-responsive human serum albumin-based nanoparticle for photodynamic therapy. ASBMB Meeting, April 26-30, 2014, San Diego, CA</p> <p>9. Cindy M. Figueroa, Moraima Morales Cruz, Bethzaida N. Suárez, Jean C. Fernández, Carmen M. Quinones, and Kai Griebenow (2014) Construction of a targeted drug delivery system through glycosylation for cancer treatment. ASBMB Meeting, April 26-30, 2014, San Diego, CA</p> <p>10. Pagán M., Del Toro N., Griebenow K., Lactate Oxidase Biosensor: A Sensor to Determine the Physical Fitness of Astronauts. NASA Annual Meeting 2014. February 2014. UPR-RP, San Juan, PR.</p> <p>11. Protein Stabilization by Glycosylation in Nano-sized Stimulus-responsive Controlled Release Systems for Intracellular Delivery. Nanomaterials for Industry. San Diego, April 6-9, 2014.</p>		
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		3	Director of the UPR Research Center of Excellence in Renewable Energy	Supervised 8 undergraduate students and 12 graduate students. The major goal of this proposal is to establish a center for excellence in renewable energy primarily based on biofuels from algae production. Patented processes of the University of Georgia collaborators are being modified and tested in a tropical environment. Furthermore, the center is sponsoring novel new initiatives in biofuels and related research on the island.		
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Dr. Néstor M. Carballeira

Publications (2009-14)

N. M. Carballeira, A. G. Bwalya, M. A. Itoe, A. D. Andricopulo, M. L. Cordero-Maldonado, M. Kaiser, M. M. Mota, A. D. Crawford, R. V. C. Guido, and D. Tasdemir “2-Octadecynoic Acid as a Dual Life Stage Inhibitor of *Plasmodium* Infections and Plasmodial FAS-II Enzymes”, **Bioorg. Med. Chem. Lett.**, 24, 4151-4157 (2014).

D. J. Sanabria-Ríos, Y. Rivera-Torres, G. Maldonado-Domínguez, I. Domínguez, C. Ríos, D. Díaz, J. W. Rodríguez, J. S. Altieri-Rivera, E. Ríos-Olivares, G. Cintrón, N. Montano, and **N. M. Carballeira** “Antibacterial Activity of 2-Alkynoic Fatty Acids Against Multidrug Resistant Bacteria”, **Chem. Phys. Lipids**, 178, 84-91 (2014).

D. Oyola-Robles, C. Rullán Lind, **N. M. Carballeira**, and A. Baerga Ortiz “Expression of Dehydratase Domains from a Polyunsaturated Fatty Acid Synthase Increases the Production of Fatty Acids in *Escherichia coli*”, **Enzyme Microb. Tech.**, 55, 133-139 (2014).

I. J. Santos-Soto, N. Chorna, **N. M. Carballeira**, J. G. Vélez-Bartolomei, A. T. Méndez, A. Chornyy, and S. Peña de Ortiz “Voluntary Running in Young Adult Mice Reduces Anxiety-Like Behavior and Increases the Accumulation of Bioactive Lipids in the Cerebral Cortex”, **PLoS One**, 8(12): e81459 (2013).

N. M. Carballeira, N. Montano, R. Álvarez-Velilla, C. F. Prada, R. M. Reguera, and R. Balaña-Fouce “Synthesis of Marine α -Methoxylated Fatty Acid Analogs that Effectively Inhibit the Topoisomerase IB from *Leishmania donovani* with a Mechanism Different from that of Camptothecin”, **Mar. Drugs**, 11, 3661-3675 (2013).

N. E. Chorna, I. J. Santos-Soto, **N. M. Carballeira**, J. L. Morales, J. de la Nuez, A. Cátala-Valentín, A. P. Chornyy, A. Vázquez-Montes, and S. Peña de Ortiz “Fatty Acid Synthase as a Factor Required for Exercise-Induced Cognitive Enhancement and Dentate Gyrus Cellular Proliferation”, **PLoS One**, 8(11): e77845 (2013).

N. M. Carballeira “Recent Developments in the Antiprotozoal and Anticancer Activities of the 2-Alkynoic Fatty Acids”, **Chem. Phys. Lipids**, 172-173, 58-66 (2013).

D. Oyola-Robles, D. C. Gay, U. Trujillo, J. M. Sánchez-Parés, M. L. Bermúdez, M. Rivera-Díaz, **N. M. Carballeira**, and A. Baerga-Ortiz “Identification of Novel Protein Domains Required for the Expression of an Active Dehydratase Fragment from a Polyunsaturated Fatty Acid Synthase”, **Protein Sci.**, 22, 954-963 (2013).

E. A. Orellano, M. M. Cartagena, K. Rosado, and **N. M. Carballeira** “Synthesis of the Novel (\pm)-2-Methoxy-6-icosynoic Acid – a Fatty Acid that Induces Death of Neuroblastoma Cells”, **Chem. Phys. Lipids**, 172-173, 14-19 (2013). (*this publication was featured in the Global Medical Discovery Series*)

N. M. Carballeira, M. Cartagena, D. Sanabria, D. Tasdemir, C. F. Prada, R. M. Reguera, and R. Balaña-Fouce "2-Alkynoic Fatty Acids Inhibit Topoisomerase IB from *Leishmania donovani*", **Bioorg. Med. Chem. Lett.**, *22*, 6185-6189 (2012).

N. M. Carballeira, M. Cartagena, F. Liu, Z. Chen, C. F. Prada, E. Calvo-Alvarez, R. M. Reguera, and R. Balaña-Fouce "First Total Synthesis of the (\pm)-2-Methoxy-6-heptadecynoic Acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", **Pure Appl. Chem.**, *84*, 1867-1876 (2012).

N. M. Carballeira, N. Montano, G. A. Cintrón, C. Márquez, C. Fernández-Prada, C. Fernández-Rubio, and R. Balaña-Fouce "First Total Synthesis and Antiprotozoal Activity of the (*Z*)-16-Methyl-11-heptadecenoic Acid, a Recently Discovered Novel Fatty Acid from the Sponge *Dragmaxia undata*", **Chem. Phys. Lipids**, *164*, 113-117 (2011).

H. Kirmizibekmez, I. Atay, M. Kaiser, R. Brun, M. M. Cartagena, **N. M. Carballeira**, E. Yesilada, and D. Tasdemir "Antiprotozoal Activity of *Melampyrum arvense* and its Metabolites", **Phytother. Res.**, *25*, 142-146 (2011).

N. M. Carballeira, N. Montano, R. M. Reguera, and R. Balaña-Fouce "The First Total Synthesis of the (\pm)-17-Methyl-*trans*-4,5-methylenooctadecanoic acid and Related Analogs with Antileishmanial Activity", **Tetrahedron Lett.**, *51*, 6153-6155 (2010).

D. Tasdemir, D. Sanabria, I. L. Lauinger, A. Tarun, R. Herman, R. Perozzo, M. Zloh, S. H. Kappe, R. Brun, and **N. M. Carballeira** "2-Hexadecynoic Acid Inhibits Plasmodial FAS-II Enzymes and Arrest Erythrocytic and Liver Stage *Plasmodium* Infections", **Bioorg. Med. Chem.**, *18*, 7475-7485 (2010).

N. M. Carballeira, M. M. Cartagena, C. Fernández Prada, C. Fernández Rubio, and R. Balaña-Fouce "Total Synthesis and Antileishmanial Activity of the Naturally Occurring Acetylenic Fatty Acids 6-Heptadecynoic Acid and 6-Icosynoic Acid", **Lipids**, *44*, 953-961 (2009).

N. M. Carballeira, C. Miranda, and K. Parang "The First Total Synthesis of (\pm)-4-Methoxydecanoic Acid: a Novel Antifungal Fatty Acid", **Tetrahedron Lett.**, *50*, 5699-5700 (2009).

N. M. Carballeira, N. Montano, R. Balaña-Fouce, and C. Fernández Prada "First Total Synthesis and Antiprotozoal Activity of (*Z*)-17-Methyl-13-octadecenoic Acid, a New Marine Fatty Acid from the Sponge *Polymastia penicillus*", **Chem. Phys. Lipids**, *161*, 38-43 (2009).

International and National Presentations - Faculty only (2009-2014)

Carballeira, N. M., Montano, N., Adorno, C., Rodríguez, A., Golovko, M. Y., and Golovko, S. A. "Novel α -Methoxylated Fatty Acids and Galactocerebrosides with Potential Biological Activities from the Caribbean Sponge *Asteropus niger*", **248th American Chemical Society National Meeting & Exposition**, San Francisco, California, August 10-14, 2014.

Carballeira, N. M., Montano, N., Adorno, C., and Rodríguez, A. "Novel Methoxylated Phospholipid Fatty Acids from the Caribbean Sponge *Asteropus niger*", **105th American Oil Chemists' Society (AOCS) Annual Meeting & Expo**, Henry B. González Convention Center, San Antonio, Texas, May 4-7, 2014.

Carballeira, N. M., Cartagena, M. M., Li, F., Chen, Z., Prada, C. F., Calvo-Alvarez, E., Reguera, R. M., and Balaña-Fouce, R. "First Total Synthesis of the (±)-2-Methoxy-6-heptadecynoic acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", **243rd American Chemical Society National Meeting & Exposition**, San Diego, California, March 25-29, 2012.

Carballeira, N. M., "Naturally Occurring Lipids as New Inspirational Motifs for Novel Antiprotozoal Compounds", **43rd IUPAC World Chemistry Congress**, Puerto Rico Convention Center, San Juan, Puerto Rico, July 30–August 5, 2011.

Carballeira, N. M., Tasdemir, D., Sanabria, D., Lauinger, I. L., Tarun, A., Herman, R., Perozzo, R., Zloh, M., Kappe, S. H., Brun, R. "2-Hexadecynoic Acid Inhibits Plasmodial FAS-II Enzymes and Arrest Erythrocytic and Liver Stage Plasmodium Infections", **239th American Chemical Society National Meeting & Exposition**, San Francisco, California, March 21-25, 2010.

Carballeira, N. M. "Recent Developments in Bioactive Sponge Phospholipid Fatty Acids-An Overview", **100th American Oil Chemists' Society (AOCS) Annual Meeting & Expo**, Rosen Shingle Creek, Orlando, Florida, May 3-6, 2009.

Carballeira, N. M. and Montano, N. "First Total Synthesis of a Novel Class of Cyclopropane Fatty Acids and Related Analogs", **100th American Oil Chemists' Society (AOCS) Annual Meeting & Expo**, Rosen Shingle Creek, Orlando, Florida, May 3-6, 2009.

Carballeira, N. M., Sanabria, D., Tasdemir, D., Lauinger, I., and Parang, K. "Synthesis and Biological Activities of a New Class of Acetylenic Fatty Acids with Potent Antimalarial and Antifungal Properties", **Zing Natural Products Conference 2009**, The Jolly Beach Resort, Antigua, March 1-4, 2009.

Local Presentations

Carballeira, N. M. "The Search for an Effective Antiprotozoal 2-Alkynoic Fatty Acid against Leishmania and Malaria- an International Collaboration", **36th ACS Senior Technical Meeting**, Hilton Ponce Golf & Resort, Ponce, Puerto Rico, November 30-December 1, 2012.

Carballeira N. M., Cartagena, M., Li, F., Chen, Z., Prada, C. F., Calvo-Alvarez, E., Reguera, R. M., and Balaña-Fouce R. "First Total Synthesis of the (±)-2-Methoxy-6-heptadecynoic Acid and Related 2-Methoxylated Analogs as Effective Inhibitors of the Leishmania Topoisomerase IB Enzyme", **35th ACS Senior Technical Meeting**, Embassy Suites Dorado del Mar, Dorado, Puerto Rico, November 3-4, 2011.

Presentations Invited Speaker

Carballeira, N. M. “The Medicinal Chemistry of the 2-Alkynoic Fatty Acids – from Parasitic Protozoa to Neuroblastoma Cells and Beyond”, Department of Chemistry and Biochemistry, **Georgia Institute of Technology**, Atlanta, Georgia, September 24, 2014.

Carballeira, N. M. and Badal-McCreath, S. “Research of Biologically Active Compounds in Puerto Rico: Opportunities and Challenges”, Panel Discussion at the AAAS-Caribbean Division Annual Meeting, University of Turabo, Gurabo, Puerto Rico, September 20, 2014.

Carballeira, N. M. “The Total Synthesis of Strychnine”, 73th Chemical Conference and Exhibition- PR Chem 2014, Ritz Carlton Convention Center Hotel & Casino, San Juan, Puerto Rico, July 29 -August 2, 2014.

Carballeira, N. M. “The Medicinal Chemistry of the 2-Methoxylated Fatty Acids – from their Isolation and Synthesis to Protozoa and Cancer Cells”, Department of Chemistry, **The University of Texas at San Antonio**, San Antonio, Texas, May 7, 2014.

Carballeira, N. M. “The Medicinal Chemistry of the 2-Alkynoic Fatty Acids – from Protozoa to Cancer Cells and Beyond”, **Department of Chemistry, University of Puerto Rico, Rio Piedras**, Puerto Rico, February 21, 2013.

Carballeira, N. M. “The Acetylenic Fatty Acids as Effective Antiprotozoal Compounds”, Interamerican University of Puerto Rico, Metro campus, September 28, 2012.

Carballeira, N. M. “Natural Marine and Terrestrial Fatty Acids as a New Source of Novel Antileishmanial Agents”, Department of Chemistry, University of Puerto Rico at Cayey, Cayey, Puerto Rico, April 26, 2011.

Carballeira, N. M. “Marine Methoxylated Fatty Acids: Isolation, Synthesis, and Biomedical Potential” **Faculty of Physical Sciences, University of Iceland**, Reykjavík, Iceland, December 10, 2010.

Carballeira, N. M., Cartagena, M. M., Balaña-Fouce, R., Fernández Prada, C., and Fernández Rubio C. “Acetylenic Fatty Acids and Related Analogs as New Antileishmanial Compounds”, **VI Interdisciplinary Scientific Research Congress**, Pedro Mir Library, Universidad Autónoma de Santo Domingo, Santo Domingo, Dominican Republic, June 10-11, 2010.

Carballeira, N. M. “Marine Lipids from the Caribbean Basin – A Fertile Area to Start Collaborations and Promote Interdisciplinary Research”, **VI Interdisciplinary Scientific Research Congress**, Pedro Mir Library, Universidad Autónoma de Santo Domingo, Santo Domingo, Dominican Republic, June 10-11, 2010.

Carballeira, N. M., Sanabria, D., Tasdemir, D., and Lauinger, I. “Fatty Acids as Enzyme Inhibitors of the Fatty Acid Synthesis of Plasmodium falciparum, the Parasite Responsible for Malaria”, Department of Biochemistry, University of Puerto Rico, Medical Sciences Campus, San Juan, Puerto Rico, February 4, 2009.

Collaborative efforts –

International

Dr. Deniz Tasdemir - RU Marine Natural Products Chemistry □ GEOMAR Centre for Marine Biotechnology (GEOMAR-Biotech) □ Am Kiel-Kanal 44 | 24106 Kiel | **Germany**

Result: 3 publications and several presentations

Dr. Rafael Balaña-Fouce - Department of Biomedical Sciences, University of León, Campus de Vegazana s/n, 24071 León, **Spain**

Result: 6 publications and several presentations

Dr. Adriano D. Andricopulo - Laboratório de Química Medicinal e Computacional, Centro de Pesquisa e Inovação em Biodiversidade e Fármacos, Instituto de Física de São Carlos, Universidade de São Paulo, São Carlos, SP, 13563-120, **Brazil**

Result: 1 publication and several presentations

National

Dr. Abel Baerga – Department of Biochemistry, Medical Sciences Campus, University of Puerto Rico

Result: 2 publications and several presentations

Dra. Sandra Peña de Ortiz - Department of Biology, University of Puerto Rico, Río Piedras campus

Result: 2 publications and several presentations

Dr. David Sanabria Ríos – Interamerican University of Puerto Rico, Metropolitan campus, PR

Result: 1 publication and several presentations

Journal Referee

Accounts of Chemical Research, Antimicrobial Agents and Chemotherapy, Archiv der Pharmazie, Biochemical Pharmacology, Bioorganic & Medicinal Chemistry, Biochimie, Bioresource Technology, Botanica Marina, Chemical Reviews, Chemistry and Physics of Lipids, Chemotherapy, Comparative Biochemistry and Physiology, Current Medicinal Chemistry, European Journal of Medicinal Chemistry, Expert Opinion on Drug Discovery, Hydrobiologia, Journal of Agricultural and Food Chemistry, Journal of Applied Biomedicine, Journal of Chemical Education, Journal of Chromatography A, Journal of Enzyme Inhibition and Medicinal Chemistry, Journal of Natural Products, Journal of Pharmacy and Pharmacology, Lipids, Marine Biology, Marine Drugs, Mini-Reviews in Medicinal Chemistry (Bentham Science Publishers), Molecules, Mycopathologia, Phytochemistry, Pure and Applied Chemistry, Synthetic Communications, Synthesis, and Tetrahedron.

Other contributions

2006-2015	Associate Editor – <i>Lipids</i>
2011-2015	Editorial Advisory Board – <i>Chemistry and Physics of Lipids</i>
2008-09	NSF Organic Synthesis Panel S and Chemical Synthesis Panel
2011, 2014	NSF Chemical Synthesis Panel and NSF Chemical Synthesis (Virtual) Panel-D
2010-16	Member (Chair 2015-16) of the NIH-NIGMS Training and Workforce Development Review Subcommittee (TWD-D)
2010-17	Member (President 2013-15) of the Board of Examiners of Chemists of Puerto Rico
2012-16	American Chemical Society-Puerto Rico Section: Councilor

Contributions to Science

1. One important aim in our research has been trying to understand how the most unusual fatty acids from our program are able to significantly inhibit key enzymes in neglected parasitic diseases such as leishmaniasis and malaria. In such an effort we have identified optimum structures that can effectively inhibit the FAS-II enzymes in *Plasmodium falciparum*, responsible for malaria, and the leishmania topoisomerase IB enzyme, important for *Leishmania donovani*. These key parasitic enzymes are amenable for therapeutic intervention because there are no similar counterparts in the corresponding mammalian hosts. Therefore, important has been to be able to inhibit these enzymes without damaging the corresponding hosts. Our research has identified the α -methoxylated fatty acids and the 2-acetylenic fatty acids, among others, as important candidates to achieve these aims. The outcome of this work is that now we can better understand how fatty acids sit in the active sites of these important enzymes, thereby increasing our understanding of lipid protein interactions.

2. Fatty acids are well known to display antibacterial, antifungal, and anticancer activities. However, in our research we have identified throughout the years many novel natural fatty acids possessing the α -methoxy functionality. One difficult question was to find out why nature is making these fatty acids and if we can use this functionality to design more potent antibacterial or anticancer lipids. In general, we have found that the α -methoxylated fatty acids are more bioactive than their corresponding non-methoxylated analogs given a comparable medium. Based on this, we designed better antineoplastic and antibacterial fatty acids. We have also shown that the unusual substitution lowers the critical micelle concentration (CMC) of the fatty acids, affect their lipophilicity as well as their solubility. This new knowledge is helping us to design better antineoplastic, antifungal, and antibacterial fatty acids.

3. Concomitant with the discovery of novel fatty acids is the question of availability, in particular when these compounds are isolated in minute amounts from natural sources and from organisms that in some cases are difficult to find. Taking into consideration the necessity to have enough material of these lipids for biophysical and biological studies, we have developed convenient synthetic routes for the synthesis of complex α -methoxylated fatty acids, mid-chain methoxylated fatty acids, and other novel fatty acids of unusual abundance in nature. These methodologies, developed in our laboratory, have permitted the further biological scrutiny of these compounds and expanded our arsenal of ways to synthesize fatty acids.

4. Probably our greatest contribution has been in the discovery of more than 100 novel fatty acids from marine organisms, in particular from Caribbean sponges. This research has expanded our present knowledge of the biosynthesis of fatty acids in nature whereby most of these fatty acids have no counterpart in terrestrial organisms. We have been able to show that many of these lipids are also of bacterial origin, which has allowed a better understanding of bacterial-host symbiotic interactions as well as an additional aid in the characterization of marine bacteria. Fatty acids are also used in the characterization of bacterial

strains and many of these fatty acid profiles are incomplete since many of these structures were not properly determined. The fatty acid composition of the marine organisms that we have studied has also been used for chemotaxonomic purposes since some fatty acids are unique only to some families.

Self-study: Professors, research, productivity						
Prof. Néstor M. Carballeira		Academic Year				
Area of evaluation	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1. Number of publications	3	2	2	2	6	3
2. Number of national and international presentations at scientific meetings	3	1	1	1	0	1
3. Number of local presentations	0	0	1	1	0	0
4. Number of presentations as an invited speaker (list the institution, research institute...)	0	1	1	1	1	4
FOR AREA 1 PROVIDE A LIST STATING JOURNAL PAGES, YEAR, TITLE. FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR						
5. Number of grants submitted						
a) Institutional	1	0	0	0	1	1
b) External						
6. Number of grants awarded						
a) Institutional	National Institutes of Health (NIH-SCI), \$988,300					
b) External		0	0	0	0	0
State amount awarded/year agencies						
7. Number of Patents						
a) Submitted	0	0	0	0	0	0
b) Awarded						
8. Collaborative efforts						
Number of collaborations						
a) Local (name, of collaborator, department, institution)						
b) National, International (name of collaborator, institution)						
c) Results from these collaborations	6	6	6	6	6	6

<p>9. Services</p> <p>a) Reviewer of manuscripts (list journals)</p> <p>b) Reviewer of proposals (list agencies, foundations...)</p> <p>c) Positions held in professional associations (list position, association)</p> <p>d) Participation in pannels, committees of professional, community</p>						
<p>10. Honors, awards or recognitions (a brief description)</p>	see enclosed	see enclosed	see enclosed	see enclosed	see enclosed	see enclosed
<p>11. Areas of research interests, impact to society, significance major achievements</p>	see enclosed	see enclosed	see enclosed	see enclosed	see enclosed	see enclosed

Prof. Kai Griebenow

8. Collaborative efforts

Loretta Roberson – UPR RP Env. Sci.

Gary Gerweis – UPR-RP Env. Sci.

Liz Diaz, UPRRP

Gary Torranzos, UPRRP

Luis Rios, UPR-RM

KC Das University of Georgia Athens

Established with above colleagues the UPR Center for Excellence in Renewable Fuels and Sustainability (DoD)

Carlos Cabrera – UPRRP Chemistry – several publications

9. Services

Reviewer for the following journals:

ACS Applied Materials & Interfaces, Analytica Chimica Acta, AAPS PharmSci, Biochemistry, Biochimie, Biochimica et Biophysica Acta, Applied Biochemistry & Biotechnology, BioDrugs, Biomaterials Science, Biotechnology & Bioengineering, Biophysical Journal, Biotechnology Progress, Canadian Journal of Chemical Engineering, Colloids and Surfaces B: Biointerfaces, Chem. Biochem. Eng. Q. Journal, Critical Rev. Biotechnol., Enzyme and Microbial Technology, European Journal of Pharmaceutical Sciences, International Journal of Pharmaceutics, Inorganica Chimica Acta, Internet Journal of Vibrational Spectroscopy, Interface, Journal of the American Chemical Society (JACS), Journal of Applied Polymer Science, Journal of Chromatography B, Journal of Pharmaceutical Sciences, Journal of Pharmacy and Pharmacology, Journal of Raman Spectroscopy, Langmuir, Methods and Findings in Experimental and Clinical Pharmacology, Molecular Pharmaceutics, New Biotechnology, Pharmaceutical Research, Process Biochemistry, Proceedings of The National Academy of Sciences USA, Nature Biotechnology, Tetrahedron.

Named Adjunct Professor to Universidad Central Del Caribe 2014.

10. Areas of research interests, impact to society, significance major achievements

Graduated the following Ph.Ds:

- [1] Dr. Betzaida Castillo (June 2003 – October 2009): Postdoc with Dr. Barletta. “*Understanding enzyme activity in organic solvents.*”
- [2] Dr. Brenda Montalvo (July 2002 – October 2009) “*Development of novel solid-phase protein formulations.*”
- [3] Dr. Jose Rodriguez (August 2004 – Dec. 2009): Univ. of Wisconsin “*Improving the in vitro stability of proteins by PEGylation.*”

- [4] Dr. Giselle Flores (August 2006-March 2012): Eli Lilly “*Characterization and formulation engineering of solid-phase proteins.*”
- [5] Dr. Jessica Mendez (August 2006-January 2013): Eli Lilly “*Protein immobilization in biocompatible nanoparticles for targeted drug delivery.*”
- [6] Miraida Pagan (August 2006-May 2015) “*Protein Immobilization on Carbon Nanotubes to Afford Biosensors and Drug Delivery Systems*”
- [7] Moraima Morales (January 2009-May 2015) “*Development of Nano-sized Delivery Systems to Improve Protein Pharmaceuticals in Cancer Applications*” Postdoctoral Fellow at University of Florida Gainesville with Dr. Rinaldi
- [8] Griselle Hernandez (May 2009-May 2015) “*Chemical Protein Glycosylation: An Alternative Method to Improve the Stability of Enzymes Immobilized on Nanosurfaces*” Postdoctoral Fellow at UPR-RP with Dr. Cabrera
- [9] Yamixa Delgado (August 2009-May 2015) “*Nano-sized Delivery Systems for Potential Cancer Therapies: Modification of Protein Formulations to Improve Pharmacological Efficacy*” Postdoctoral Fellow at UPR-RP with Dr. Tinoco

Invited Talks:

- Chemical Protein Glycosylation: A new Approach to Protein Stabilization. Kai H. Griebenow. 20th International Symposium on Glycoconjugates Glycans: From Molecules to Structures to Therapeutics, November 29 – December 4, 2009, Caribe Hilton Hotel, San Juan, Puerto Rico. USA
- Chemical glycosylation and its impact on protein structure, function, and dynamics. October 19, 2011, Dept. of Biology, University of Puerto Rico.
- Center for Renewable Energy and Sustainability. Interdisciplinary Symposium on Energy-Technology, Policy and Design. April 12, 2012, UPR-RP.
- Center for Renewable Energy and Sustainability. DoD Site Visit June 1, 2012, UPR-RP.
- Stimulus-responsive Nanosized Protein Drug Delivery Systems. UPR-RP, Dept. of Chemistry, Febr. 6, 2013
- Protein Stabilization by Glycosylation in Stimulus-Responsive Controlled Release Systems for Intracellular Delivery, University of Michigan in Ann Arbor, College of Pharmacy, October 2, 2013.
- Protein Stabilization by Glycosylation in Nano-sized Stimulus-responsive Controlled Release Systems for Intracellular Delivery. Nanomaterials for Industry. San Diego, April 6-9, 2014.

Publications since 2009:

- [1] Morales-Cruz M, Cruz-Montañez A, Figueroa CM, González-Robles T, Muñoz-Perez L, Molina A, Griebenow K (2015) Redox-responsive micelle-like nanoparticles for the targeted delivery of apoptotic proteins to tumor cells, *Int. J. Nanomed.*, submitted.
- [2] Diaz L, Morales-Cruz M, Hernández-Cancel G, Griebenow K (2015) Use of Peer-Review and Instructor-Review Activities to Improve University Students' Laboratory Report Writing in an Introductory Chemistry Course, *J College Science Teaching*, under revision.
- [3] Hernández-Cancel G, Suazo-Davila D, Ojeda-Cruzado A, Garcia D, Cabrera C, Griebenow K (2015) Graphene Oxide as a Protein Matrix: Influence on Protein Biophysical Properties, *J. Nanobiotechnol.*, in press.
- [4] Figueroa CM, Morales-Cruz M, Suárez BN, Molina AM, Fernández JC, Quiñones CM, Griebenow K (2015) Induction of cancer cell death by hyaluronic acid-mediated uptake of cytochrome c. *J. Nanomed. Nanotech.* 6: 316.
- [5] Saxena M, Sharma RK, Ramirez-Paz J, Tinoco A, and Kai Griebenow K (2015) Purification and characterization of cytochrome c from the pathogenic fungus *Rhizopus arrhizus*, *BMC Biochemistry* 16: 21.
- [6] Delgado Y, Moraima Morales-Cruz, José Hernández-Román, Glinda Hernández, Kai Griebenow (2015) Development of HAMLET-like Cytochrome c-Oleic Acid Nanoparticles for Cancer Therapy, *J. Nanomed. Nanotechnol.* 6(4): 303.
- [7] Molina AM, Morales-Cruz M, Benítez M, Berrios K, Figueroa CM, Griebenow K (2015) Redox-sensitive cross-linking enhances HSA nanoparticle function as delivery system for photodynamic cancer therapy. *J. Nanomed. Nanotechnol.* 6(3): 294.
- [8] Delgado Y, Morales-Cruz M, Figueroa CM, Hernández-Román J, Hernández G, Griebenow K (2015) The cytotoxicity of BAMLET complexes is due to oleic acid and independent of the α -lactalbumin component, *FEBS Open Bio* 5: 397-404.
- [9] Hernández-Cancel G, Suazo-Dávila D, Medina-Guzmán J, Rosado-González M, Díaz-Vázquez LM, Griebenow K (2015) Chemical glycosylation to improve the stability of an amperometric horseradish peroxidase biosensor. *Anal. Chim. Acta* 854: 129–139.
- [10] Pagán M, del Toro N, Suazo D, Griebenow K (2014) A comparative study of different protein immobilization methods for the construction of an efficient nano-structured lactate oxidase-CNT-biosensor. *Biosensors & Bioelectronics* 64: 138–146.
- [11] Morales-Cruz M, Figueroa CM, González-Robles T, Delgado-Reyes Y; Molina A, Méndez J, Morales M, Griebenow K (2014) Activation of caspase-dependent apoptosis by intracellular delivery of cytochrome c-based nanoparticles. *J. Nanobiotechnology* 12: 33
- [12] Yamixa Delgado, Moraima Morales-Cruz, José Hernández-Román, Yashira

- Martínez and Kai Griebenow (2014) Chemical glycosylation of cytochrome c improves physical and chemical protein stability. *BMC Biochemistry* **15**: 16
- [13] Nicolau E, Fonseca, JF, Rodriguez Martínez JA, Richardson T-M, Flynn M, Griebenow K, Cabrera CR (2014) Evaluation of a urea bioelectrochemical system for wastewater treatment processes. *ACS Sustainable Chem. & Eng.* **2**(4): 749-754.
- [14] Mendez J; Morales-Cruz M; Delgado-Reyes Y; Orellano E; Morales M; Monteagudo A; Griebenow K (2014) Intracellular delivery of glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. *Mol. Pharm.* **11**(1): 102-11. PMID: PMC3905321
- [15] Morales-Cruz M, Flores-Fernández GM, Morales-Cruz M, Orellano EA, Rodríguez-Martínez JA, Ruiz M, Griebenow K (2012) Two-step nanoprecipitation for the production of protein-loaded PLGA nanospheres. *Res. Pharma Sci.* **2**: 79-85. PMID: PMC3541529
- [16] Flores-Fernandez GM, Griebenow K (2012) Glycosylation improves α -chymotrypsin stability upon encapsulation in poly(lactic-co-glycolic)acid microspheres. *Res. Pharma Sci.* **2**: 46-51. PMID: PMC3572538
- [17] Montalvo BL, Sosa B, Griebenow K (2012) Improved enzyme activity and stability in polymer microspheres by encapsulation of protein nanospheres. *AAPS PharmSciTech* **13**(2): 632–636. PMID: PMC3364394
- [18] Méndez J, Monteagudo A, Griebenow K (2012) Stimulus-responsive controlled release system by covalent immobilization of an enzyme into mesoporous silica nanoparticles. *Bioconj. Chem.* **23**(4): 698-704. PMID: PMC3329583.
- [19] Nicolau E, Mendez J, Griebenow K, Cabrera CR (2012) Bioelectrochemistry of non-covalent immobilized alcohol dehydrogenase on oxidized diamond nanoparticles. *Bioelectrochem.* **85**: 1-6.
- [20] Díaz-Vázquez LM, Casañas Montes B, Echevarría Vargas I, Hernández G, González Illán F, Molina Calzada A, Morales Cruz M, Torres-Díaz C, Griebenow K (2012) An investigative, cooperative learning approach for general chemistry laboratories. *Int. J. SoTL* **6**(2).
- [21] Santiago-Rodríguez, Lenibel; Mendez J, Flores-Fernandez G, Pagán M, Rodríguez-Martínez J Cabrera CR, Griebenow K (2011) Enhanced stability of a cytochrome c biosensor by PEGylation. *J. Electrochem.* **663**: 1-7.
- [22] Rodríguez-Martínez JA, Rivera-Rivera I, Griebenow K (2011) Prevention of benzyl alcohol-induced aggregation of chymotrypsinogen by PEGylation. *J. Pharm. Pharmacol.* **63**(6): 800-5. NIHMSID 302875 PMID: PMC3121166
- [23] Nicolau E, Rodríguez-Martínez JA, Fonseca JJ, Richardson T-M J, Flynn M, Griebenow K, Cabrera CR (2010) Bioelectrochemical oxidation of urea with urease and platinized boron doped diamond electrodes for water recycling in space applications. *ECS Transactions* **33** "Polymer Electrolyte Fuel Cells 10", 201.

- [24] Flores-Fernández GM, Pagán M, Almenas M, Solá RJ, and Griebenow K (2010) Glycosylation reduces moisture-induced instabilities of α -chymotrypsin in the solid state. *BMC Biotechnology* **10**(1): 57, PMCID: PMC2924255
- [25] Bansal V, Delgado Y, Fasoli E, Legault M, Griebenow K, Barletta GL (2010) Effect of prolonged exposure to organic solvents on the active site environment of subtilisin Carlsberg. *J Mol Catal B Enzym* **64**(1-2): 38-44.
- [26] Castillo B, Delgado Y, Barletta G, Griebenow K (2010) Enantioselective transesterification catalysis by nanosized serine protease subtilisin Carlsberg particles in tetrahydrofuran. *Tetrahedron* **66**: 2175–2180, NIHMS172780, PMCID: PMC2908921
- [27] Solá RJ, Griebenow K. (2010) Glycosylation of therapeutic proteins: an effective strategy to optimize efficacy. *BioDrugs* **24**(1): 9-21. NIHMS:150932, PMCID: PMC2805475
- [28] Flores-Fernández GM, Solá R, Griebenow K (2009) On the relation between moisture-induced aggregation and structural changes in lyophilized insulin. *J. Pharm. Pharmacol.* **61**: 1555–1561.
- [29] Nicolau E, Gonzalez-Gonzalez I, Griebenow K, Cabrera CR (2009) Bioelectrochemical degradation of urea at platinized boron doped diamond electrodes for bioregenerative systems. *Adv. Space Res.* **44**: 965-970.
- [30] Rodríguez-Martínez JA, Rivera-Rivera I, Solá RJ, Griebenow K (2009) Enzymatic activity and thermal stability of PEG- α -chymotrypsin conjugates. *Biotechnol. Lett.* **31**: 883-887, PMCID: PMC2719889
- [31] Pagán M, Solá R, Griebenow K (2009) On the role of protein structural dynamics in the catalytic activity and thermostability of serine protease subtilisin Carlsberg. *Biotechnol. Bioeng.* **103**(1): 77-84, PMCID: PMC2668246
- [32] Solá RJ, Griebenow K (2009) Effects of glycosylation on the stability of protein pharmaceuticals. *J. Pharm. Sci.* **98**(4): 1223-1245. PMCID: PMC2649977

Presentations since 2009:

- [1] Liz Díaz and Kai Griebenow (2009) Introducing Method Development through Multivariable Experimental Design. The SoTL Commons Conference, March 11-13, 2009, Georgia Southern University, Statesboro, GA, USA.
- [2] Mariangely Almenas, Giselle Flores, Miraida Pagán, and Kai Griebenow (2009) Mechanism of Moisture-induced Solid-phase Aggregation and Stabilization of Protein, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.
- [3] Izarys Rivera, Jose Rodríguez-Martínez, Kai Griebenow (2009) Prevention of Benzyl Alcohol Induced Aggregation of A-Chymotrypsinogen Upon Pegylation, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.

- [4] *Giselle Flores*, Miraida Pagán, Mariangely Almenas, and Kai Griebenow (2009) Mechanism of Moisture-induced Solid-phase Aggregation and Stabilization of Protein, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.
- [5] *Yamaris Pacheco* and Kai Griebenow (2009) Nanoparticulate Protein Formulations, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.
- [6] *Miraida Pagan*, Giselle Flores, Mariangely Almenas and Kai Griebenow (2009) Chemical Glycosylation: A New Method to Prevent Solid-Phase Protein Aggregation, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.
- [7] *José Fonseca*, Eduardo Nicolau, José Rodríguez, Kai Griebenow, and Carlos Cabrera (2009) Bioelectrochemical Detection of Urea at Platinized Boron-Doped Diamond Electrode, 29th PRISM and 44th ACS Jun. Tech. Meeting, UPR-RP, San Juan, March 14, 2009.
- [8] *Jose A Rodriguez-Martinez*, Ricardo J Sola, Betzaida Castillo, Izarys Rivera-Rivera, Hector R. Cintron-Colon, Gabriel Barletta, and Kai Griebenow (2009) Increasing alpha-chymotrypsin thermodynamic stability upon PEGylation correlates with reduced structural dynamics, Spring 2009 National Meeting & Exposition, 237th ACS National Meeting & Exposition, March 22-26, 2009, Salt Lake City, UT.
- [9] Liz M. Díaz-Vázquez, *Carlos M. Torres-Díaz*, Kai Griebenow, Camille González-Robles, Moraima Morales, Ileabett Echevarria, Alejandra Cruz, Gustavo Acosta, Francisco Colón, Anaís Vázquez, and Nioviz Ramírez (2009) Improving the inquiry approach through computer-based technologies in the general chemistry laboratory, Spring 2009 National Meeting & Exposition, 237th ACS National Meeting & Exposition, March 22-26, 2009, Salt Lake City, UT.
- [10] *Miraida Pagán*, Ricardo J Solá, and Kai Griebenow (2009) Chemical Protein Glycosylation: Method to Prevent Protein Instabilities on Biosensors, 2nd Puerto Rico NSF/RII EPSCoR/IFN Annual Meeting, April 16, Mayaguez, PR.
- [11] *Kai Griebenow* (2009) Laboratory for Applied Biochemistry and Nanobiotechnology, Griebenow's Research Group, 2nd Puerto Rico NSF/RII EPSCoR/IFN Annual Meeting, April 16, Mayaguez, PR.
- [12] *Jessica Méndez* and Kai Griebenow (2009) Mesoporous Silica Nanoparticles as Drug Delivery Devices, 2nd Puerto Rico NSF/RII EPSCoR/IFN Annual Meeting, April 16, Mayaguez, PR.
- [13] *Yamaris Pacheco Moctezuma* and Kai Griebenow (2009) Nanoparticulate Protein Formulations, 2nd Puerto Rico NSF/RII EPSCoR/IFN Annual Meeting, April 16, Mayaguez, PR.

- [14] *José A. Rodríguez-Martínez*, Izarys Rivera-Rivera, and Kai H. Griebenow (2009) Protein PEGylation Prevents Benzyl Alcohol-Induced Aggregation, FASEB Experimental Biology Meeting, New Orleans, LA, April 18-22.
- [15] *Moraima Morales Cruz*, José A. Rodríguez, Cindy Figueroa, Myreisa Morales and Kai Griebenow (2009) Development of Protein-Loaded PLGA Nanoparticles for Controlled Release, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [16] *Liz Díaz*, Bárbara Casañas, Moraima Morales, Ileabett Echevarría, Griselle Hernández, Fernando González, Carlos Torres and Kai Griebenow (2009) Integrating Research Experiences in the General Chemistry Laboratory Course, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [17] *Griselle Hernández*, Camille González, Anaiz Vázquez, Jeniffer Concepción, Yoreilys Rivera, Lenibel Santiago, Liz Díaz, Kai Griebenow and Carlos Cabrera (2009) On the Potential Use of PEGylated Enzymes in Biosensor Applications, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [18] *Miraida Pagan*, Ricardo Solá and Kai Griebenow (2009) On the Role of Protein Structural Dynamics in the Catalytic Activity and Thermostability of Serine Protease Subtilisin Carlsberg, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [19] *Giselle M. Flores-Fernández*, Miraida Pagan, Mariangely Almenas and Kai Griebenow (2009) Glycosylation Prevents Moisture-Induced Instabilities of α -Chymotrypsin in the Solid State, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [20] *José A. Rodríguez-Martínez*, Izarys Rivera-Rivera and Kai Griebenow (2009) Prevention of Benzyl Alcohol-Induced Aggregation of Chymotrypsinogen by PEGylation, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [21] *Jessica Méndez* and Kai Griebenow (2009) Covalent Immobilization of Modified Enzymes Into Mesoporous Silica Particles for Drug Delivery Applications, ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [22] *Griselle Hernández*, Ileabett Echevarría, Kai Griebenow and Liz Díaz, An Investigative, Cooperative Learning Approach to the General Chemistry Laboratory. ACS SERMACS, October 21-24, Convention Center, San Juan, PR.
- [23] *Giselle M Flores-Fernandez*, Miraida Pagan, Mariangely Almenas, Kai H. Griebenow. Glycosylation Prevents Moisture-Induced Instabilities of α -Chymotrypsin in the Solid State. 20th International Symposium on Glycoconjugates Glycans: From Molecules to Structures to Therapeutics, November 29 – December 4, 2009, Caribe Hilton Hotel, San Juan, Puerto Rico. USA
- [24] *Miraida Pagan*, Ricardo J. Solá, Kai Griebenow. On the role of protein structural dynamics in the catalytic activity and thermostability of serine protease subtilisin Carlsberg. 20th International Symposium on

Glycoconjugates Glycans: From Molecules to Structures to Therapeutics,
November 29 – December 4, 2009, Caribe Hilton Hotel, San Juan, Puerto Rico.
USA

- [25] *Moraima Morales, Liz Diaz, Griselle Hernández, Kai Griebenow.* Comparison between Student Peer Review and Instructor Review Effectiveness for the General Chemistry Laboratory Written Reports. Conference for the Scholarship in Teaching and Learning, March 10-12, 2010, Georgia Southern University, Statesboro, Georgia.
- [26] *Griselle Hernandez, Ileabett Echevaria, Liz Díaz-Vazquez, Kai Griebenow.* An Investigative and Cooperative Learning Approach to the General Chemistry Laboratory. Conference for the Scholarship in Teaching and Learning, March 10-12, 2010, Georgia Southern University, Statesboro, Georgia.
- [27] *Liz Diaz-Vazquez, Griselle Hernández, Moraima Morales, Kai Griebenow.* Integrating Research Experiences in the General Chemistry Laboratory Course. Conference for the Scholarship in Teaching and Learning, March 10-12, 2010, Georgia Southern University, Statesboro, Georgia.
- [28] *Camille González, Anaís Vázquez, Angel Morales, Liz Díaz, Carlos R. Cabrera, and Kai Griebenow.* Development of a Peroxide Biosensor for the Detection of Endocrine Disrupting Chemicals. 1st Congress on NanoEngineering for Biology and Medicine, Huston, Texas, Febr. 7-10, 2010.
- [29] *Gonzalez, Camille, Anaís Vázquez, Angel Morales, Liz Díaz, Carlos R. Cabrera, and Kai Griebenow.* Development of a Peroxide Biosensor for the Detection of Endocrine Disrupting Chemicals (EDCS). 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.
- [30] *Delgado, Yamixa; Castillo, Betzaida; Barletta, Gabriel; Griebenow, Kai.* In Vitro and in Silico Enantioselective Transesterification. 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.
- [31] *Mendez, Jessica; Monteagudo, Alina; Griebenow, Kai.* Covalent Immobilization of Modified Enzyme into Mesoporous Silica Particles for Drug Delivery Applications. 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.
- [32] *Pacheco, Yamaris; Griebenow, Kai.* Nanoparticulate Protein Formulations. 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.
- [33] *Pagan, Miraida; Sola, Ricardo; Griebenow; Kai.* Chemical Protein Glycosylation: Method to Prevent Protein Instabilities in Biosensor Applications. 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.
- [34] *Monteagudo, Alina; Jessica Mendez, Kai Griebenow.* Covalent Immobilization of Carbonic Anhydrase into Mesoporous Silica Particles for Drug Delivery

Applications. 45th ACS Junior Technical Meeting, University of Puerto Rico, Mayagüez Campus, March 13, 2010.

- [35] *Griselle Hernández, Liz Díaz, Carlos Cabrera and Kai Griebenow.* PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. Center for Advance Nanoscale Material-NASA URC, UPR Cayey-November, 2010
- [36] *Yamixa Delgado and Kai Griebenow.* Effect of chemical glycosylation on peptides biophysical properties: a computational study, 36th FEBS Congress "Biochemistry for Tomorrow's Medicine; June 27, 2011, Centro Congressi Lingotto, Turin, Italy.
- [37] *Miraida Pagan, Meyya Meyyapaan, Kai Griebenow.* Carbon Nanofibers as Principal Support Material for the Development of Robust Electrodes for Biosensor Applications. Summer Internship Poster Presentation at NASA Ames Research Center. NASA Ames Research Center, Moffett Field, California. July 2011.
- [38] *Griselle Hernández, Liz Díaz, Carlos Cabrera and Kai Griebenow.* PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. 43rd IUPAC World Chemistry Congress, Puerto Rico Convention Center- August 1, 2011
- [39] *Miraida Pagan, Meyya Meyyappan, Kai Griebenow,* Development of Lactate biosensor for monitoring the physical fitness of astronauts, 2011 International Astronautical Congress Cape Town, South Africa, October 2011.
- [40] *Griselle Hernández, Liz Díaz, Carlos Cabrera and Kai Griebenow.* PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. American Association for the Advancement of Science (AAAS), UPR Mayaguez, October 1, 2011
- [41] *Griselle Hernández, Liz Díaz, Carlos Cabrera and Kai Griebenow.* PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. NASA CANM II site visit, UPR-RP, January 30, 2012.
- [42] *Miraida Pagan, Meyya Meyyappan, Kai Griebenow,* Development of Lactate biosensor for monitoring the physical fitness of astronauts. NASA CANM II site visit, UPR-RP, January 30, 2012.
- [43] *Frances M. Acevedo, Cindy M. Figueroa, and Kai Griebenow.* Targeted and sustained delivery of glycolysis inhibitors from PLGA nanoparticles. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina
- [44] *Yamixa Delgado, Yashira Martinez and Kai Griebenow.* Effect of chemical glycosylation on insulin biophysical properties. Puerto Rico Interdisciplinary Scientific Meeting, March 10, 2012, University of Puerto, Carolina Campus
- [45] *Gladys Díaz-Vázquez, Anna M. Molina-Calzada, and Kai Griebenow.* Modulation of biophysical properties of the model enzyme lysozyme upon chemical glycosylation. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina

- [46] *Marimar Benítez*, Yamaris Pacheco, Kai Griebenow. Protein nanoparticle modification with activated lactose for targeted drug delivery purposes. ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina
- [47] *Griselle Hernández*, Liz Díaz, Carlos Cabrera and Kai Griebenow. PEGylation of enzymes to develop a stable amperometric enzyme-based biosensor. American Association for the Advancement of Science (AAAS), ACS Junior Technical Meeting and PRISM, March 10, 2012, UPR-Carolina
- [48] *Alina Montagudo*, Jessica Mendez, and Kai Griebenow. Stimulus-responsive controlled release system by covalent immobilization of an enzyme into mesoporous silica nanoparticles. ACS National Meeting, San Diego CA, March 24- 30 2012
- [49] *Moraima Morales*, Myreisa Morales, and Kai Griebenow. Development of a novel two-step nanoprecipitation method for encapsulating proteins into biodegradable polymer nanoparticles. Chemical Biology and Novel Tools in Pharmacology, Hilton Santa Fe/Historic Plaza, Santa Fe, New Mexico, Feb.12-16, 2012
- [50] *Cindy M. Figueroa*, Frances Acevedo, and Kai Griebenow. Sustained delivery of glycolysis inhibitors from PLGA nanoparticles. Chemical Biology and Novel Tools in Pharmacology, Hilton Santa Fe/Historic Plaza, Santa Fe, New Mexico, Feb.12-16, 2012
- [51] *Yamixa Delgado*, Yashira Martinez and Kai Griebenow. Effect of chemical glycosylation on insulin biophysical properties. Chemical Biology and Novel Tools in Pharmacology, Feb 13, 2012, Santa Fe, New Mexico
- [52] *Tania J. González-Robles*, Moraima Morales-Cruz, and Kai Griebenow. Folate receptor targeted cytochrome c mediated cancer cell death. 36th ACS Senior Technical Meeting, November 30th to December 1st, 2012, Hilton Golf & Casino Resort, Ponce, PR
- [53] *Kiara Berríos*, Anna Molina, and Kai Griebenow. Design and synthesis of protein nanoparticles as delivery system for photodynamic therapy. 33rd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) & 48th ACS Junior Technical Meeting, March 9, 2013, Univ. of Turabo, Caguas
- [54] *Tania J. González-Robles*, Moraima Morales-Cruz, and Kai Griebenow. Folate receptor targeted cytochrome c mediated cancer cell death. 33rd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) & 48th ACS Junior Technical Meeting, March 9, 2013, Univ. of Turabo, Caguas
- [55] *Christian D. Torres-López*, Griselle Hernández-Cancel and Kai Griebenow. Glycosylation Of Horseradish Peroxidase To Enhance Enzyme Stability. 33rd Puerto Rico Interdisciplinary Scientific Meeting (PRISM) & 48th ACS Junior Technical Meeting, March 9, 2013, Univ. of Turabo, Caguas

- [56] *Benitez, Marimar; Pacheco, Yamaris; Griebenow, Kai* (2013) Protein nanoparticle modification for targeted drug delivery purposes, 245th ACS National Meeting & Exposition, April 7-11, 2013, New Orleans, Louisiana.
- [57] *Gonzalez-Robles, Tania J.; Morales-Cruz, Moraima; Griebenow, Kai* (2013) Folate receptor targeted cytochrome C mediate cancer cell death, 245th ACS National Meeting & Exposition, April 7-11, 2013, New Orleans, Louisiana
- [58] *Griselle Hernández-Cancel, Damaris Suazo, Johnsue Medina-Guzmán, María Rosado-González, Liz Díaz, and Kai Griebenow.* Use of glycosylated horseradish peroxidase to improve the stability of an amperometric enzyme-based biosensor. 2nd International Conference and Exhibition on Biosensors & Bioelectronics; Chicago, IL, June 2013 (Received a price for poster.)
- [59] *Moraima Morales-Cruz, Cindy Figueroa, Tania Gonzalez, Anna Molina, Yamixa Delgado, and Kai Griebenow* (2013) Activation of caspase-dependent apoptosis by intracellular delivery of tumor-targeted cytochrome c-based nanoparticles. 1st PR Cell Signaling Conference, San Juan, November 9, 2013.
- [60] *Manoj Saxena, Josell Ramirez, and Kai Griebenow* (2013) Functional and biophysical study of recombinant cytochrome c variants for potential drug use. 1st PR Cell Signaling Conference, San Juan, November 9, 2013.
- [61] *Yamixa Delgado, José Hernández, and Kai Griebenow* (2013) Development of protein-fatty acid nanoparticles for tumor-selective delivery. 1st PR Cell Signaling Conference, San Juan, November 9, 2013.
- [62] *Nicole M. Del Toro Pagán; Kai Griebenow, Ph.D.; and Miraida Pagán,* (2013) Lactate Oxidase Biosensor: A Sensor to Determine the Physical Fitness of Astronauts. ABRCMS Conference Nov. 13-16, Nashville, TN.
- [63] *Yamixa Delgado, José Hernández, Kai Griebenow* (2013) Development of protein-fatty acid nanoparticles for tumor-selective delivery. The 12th US-Japan Symposium on Drug Delivery Systems Conference, Lahaina, Maui, Hawaii, Monday, December 16 to Friday, December 20, 2013.
- [64] *Cindy M. Figueroa, Bethzaida N. Suarez, Jessica Mendez, Moraima Morales, Yamixa Delgado and Kai Griebenow* (2013) Delivery of chemically glycosylated cytochrome c immobilized in mesoporous silica nanoparticles induces apoptosis in HeLa cancer cells. The 12th US-Japan Symposium on Drug Delivery Systems Conference, Lahaina, Maui, Hawaii, Monday, December 16 to Friday, December 20, 2013.
- [65] *Rohit Kumar Sharma, M. Saxena, Kai Griebenow* (2014) Formation of biodiesel from Caribbean macroalgae lipids by using lipase nanoparticles. 2nd DoD Site Visit, UPR-RP, Febr. 20, 2014
- [66] *Freisa M. Joaquín Ovalle, Kai Griebenow* (2014) Thylakoid Membrane Solubilization of *Botryococcus braunii* for the Isolation and Characterization of the Main Components of the Photosynthetic Apparatus. 2nd DoD Site Visit, UPR-RP, Febr. 20, 2014

- [67] *Manoj Saxena, Josell Ramirez, and Kai Griebenow (2014) Functional and biophysical study of recombinant cytochrome c variants for potential drug use. PRISM 2014, March 29, UPR Cayey*
- [68] *Johnsue Medina-Guzmán, Griselle Hernández-Cancel, and Kai Griebenow (2014) Use Of Glycosylated Horseradish Peroxidase To Improve The Stability Of An Amperometric Enzyme-Based Biosensor. PRISM 2014, March 29, 2014, UPR Cayey*
- [69] *Virginia Rojas, Josell Ramirez, Manoj Saxena and Kai Griebenow (2014) Site-selective mutation of L-Asparaginase II: structure and activity characterization. PRISM 2014, March 29, UPR Cayey*
- [70] *Marimar Benitez, Anna Molina Calzada, Kai Griebenow (2014) Protein-photosensitizer nanoparticles for the treatment of cancer. IVY Plus Symposium, Cambridge, MA, March 13-16, 2014.*
- [71] *Freisa M. Joaquín Ovalle, Kai Griebenow (2014) Thylakoid Membrane Solubilization of Botryococcus braunii for the Isolation and Characterization of the Main Components of the Photosynthetic Apparatus. Young Algeiners 2014, Mt. Pellier & Narbonne, April 3-5, 2014.*
- [72] *Pagán M., Griebenow K., Development of a Lactate Biosensor for Monitoring the Physical Fitness of Astronauts. NASA Annual Review Meeting 2013, April 18, 2013, UPR-RP, San Juan, PR.*
- [73] *Anna M. Molina, Moraima Morales-Cruz, Marimar Benítez, Kiara Berríos, Kai Griebenow (2014) Design of a stimulus-responsive human serum albumin-based nanoparticle for photodynamic therapy. ASBMB Meeting, April 26-30, 2014, San Diego, CA*
- [74] *Cindy M. Figueroa, Moraima Morales Cruz, Bethzaida N. Suárez, Jean C. Fernández, Carmen M. Quinones, and Kai Griebenow (2014) Construction of a targeted drug delivery system through glycosylation for cancer treatment. ASBMB Meeting, April 26-30, 2014, San Diego, CA*
- [75] *Pagán M., Griebenow K., Protein Chemical Glycosylation: A method to increase the stability of proteins. 2013 Lilly Academy Technical Forum. May 3, 2013. Convention Center PR, San Jaun, PR.*
- [76] *Pagán M., Del Toro N., Griebenow K., Lactate Oxidase Biosensor: A Sensor to Determine the Physical Fitness of Astronauts. NASA Annual Meeting 2014. February 2014. UPR-RP, San Juan, PR.*
- [77] *Delgado Y, Morales-Cruz M, Figueroa CM, Hernández-Román J, Hernández G, and Griebenow K (2014) The cytotoxicity BAMLET complex is regulated by the dispersion of the oleic acid and independent of α -lactalbumin component. BioTech Connect World: Pharma & Biomaterials, June 16, 2014, Washington DC, US.*
- [78] *J. Ramirez-Paz, M. Saxena, R.K. Sharma, K. Griebenow. Effects of site-selective glycosylation of L-asparaginase II on its structure, activity and stability. 29th*

AAAS Caribbean Division Meeting. September 20th, 2014. Caguas, Puerto Rico.

- [79] *J. Ramirez-Paz, M. Saxena, R.K. Sharma, K. Griebenow. Site-selective glycosylation of L-asparaginase II: effects on structure, activity and stability. 1st Puerto Rico Cancer Research Meeting. October 3rd, 2014. Carolina, Puerto Rico.*
- [80] *Ramirez-Paz J, Saxena M, Sharma R, and Griebenow K (2014) Enhancing the stability of L-asparaginase II by chemical glycosylation. ACS Senior Technical Meeting, November 7, 2014, Old San Juan.*
- [81] *Hernández-Cancel, Griselle, Suazo-Dávila, D, Díaz-Vázquez L., and Griebenow, Kai (2014) Chemically glycosylation improves the stability of an amperometric horseradish peroxidase biosensor. ACS Senior Technical Meeting, November 7, 2014, Old San Juan.*
- [82] *J. Ramirez-Paz, M. Saxena, R.K. Sharma, K., Griebenow (2014) Enhancing the stability of L-asparaginase II by chemical glycosylation. NSF EPSCoR/IFN Annual Meeting 2014. November 7-8th, 2014. Caguas, Puerto Rico.*
- [83] *Pagán M., Del Toro N., Suazo, D., Griebenow K. (2014) A comparative study of different protein immobilization methods for the construction of an efficient nano-structured lactate oxidase-CNT-biosensor. NSF EPSCoR/IFN Annual Meeting 2014. November 7-8th, 2014. Caguas, Puerto Rico.*
- [84] *Rojas, V., Ramirez-Paz, J. & Griebenow K (2015) The effect of the signal peptide on L-asparaginase II secretion. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*
- [85] *Rohit Kumar Sharma, Manoj Saxena, Josell Ramirez- Paz, and Kai Griebenow (2015) Development and application of renewable lipase nanoparticles in sustainable production of biodiesel and transformation of glycerol into pharmaceutical precursors. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*
- [86] *Moraima Morales-Cruz, Alejandra Cruz, Tania González-Robles, Cindy Figueroa, Laura Muñoz, Anna Molina and Kai Griebenow (2015) Targeted Delivery of Cytochrome c-based Nanoparticles Coated with a Poly(lactic-co-glycolic acid)-Poly(ethylene glycol)-Folate Conjugate to HeLa Cells. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*
- [87] *Jean Carlos Fernandez, Moraima Morales-Cruz, Bethzaida N Suarez, Cindy M Figueroa, Kai Griebenow (2015) Construction of a targeted delivery system based on hyaluronic acid and cytochrome c for cancer treatment. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*
- [88] *Marimar Benitez, Anna M. Molina, and Kai Griebenow (2015) Development of an amygdalin delivery system for cancer treatment. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*

- [89] *Josell Ramirez Paz, Manoj Saxena, Rohit K. Sharma, Kai Griebenow (2015) Site-specific glycosylation of L-asparaginase II: effects on structure, activity and stability. PRISM, March 14, 2015, University of Puerto Rico – Rio Piedras Campus.*
- [90] *Manoj Saxena, Josell Ramirez-Paz, Rohit Kumar Sharma, and Kai Griebenow (2015) Site specific chemical glycosylation of cytochrome c to enhance its stability for apoptosis induction in cancer cells. 2nd PR Cell Signaling Conference, San Juan, April 10, 2015. [Selected for oral presentation.]*
- [91] *J. Davila, M. Morales Cruz, K. Rolon Reyes, M. Inyushin, K. Griebenow, L. Kucheryavykh (2015) Selective targeting of glioblastoma using folate-decorated nano-particulate cytochrome c drug constructs. 2nd PR Cell Signaling Conference, San Juan, April 10, 2015.*
- [92] *Tania J. González-Robles, Moraima Morales-Cruz, Cindy M. Figueroa, Yamixa Delgado, Anna Molina, Jessica Méndez, Myraida Morales, and Kai Griebenow (2015) Activation of caspase-dependent apoptosis by intracellular delivery of cytochrome c-based nanoparticles. Conference of Experimental Biology, March 28 to April 1, 2015, Boston Convention & Exhibition Center, 415 Summer St, Boston, MA 02210*
- [93] *Cindy M. Figueroa, Bethzaida N. Suárez, Moraima Morales-Cruz, Jean C. Fernández, Anna M. Molina, and Kai Griebenow (2015) Cytochrome c nanoparticle formulation for specific delivery to cancer cells, Interphex, PR Convention Center, San Juan, October 15-16, 2015.*
- [94] *Anna M. Molina, Moraima Morales-Cruz, Marimar Benítez, Kiara Berríos, Cindy M Figueroa, Kai Griebenow (2015) Redox-sensitive cross-linking enhances albumin nanoparticle function as delivery sytem for photodynamic cancer therapy. Interphex 2015, San Juan, PR. Oct 15-16, 2015.*

Self-study: Professors, research, productivity GRIEBENOW							
Area of evaluation	Academic Year						
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
1. Number of publications	5	5	1	6	1	11	
2. Number of national and international presentations at scientific meetings	5	4	3	4	6	7	
3. Number of local presentations	19	7	2	8	6	23	
4. Number of presentations as an invited speaker (list the institution, research institute...)					1 University Mich	1 San Diego	
FOR AREA 1 PROVIDE A LIST STATING JOURNAL PAGES, YEAR, TITLE. FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR							
5. Number of grants submitted							
a) Institutional							
b) External	b) 2	b) 1	b) 2	b) 1	b) 1	b) 0	
6. Number of grants awarded							
a) Institutional							
b) External							
State amount awarded/year agencies	b) 0	b) 1	b) 0	b) 0	b) 0	b) 0	
7. Number of Patents							
a) Submitted							
b) Awarded	0	0	1	0	0	0	0
8. Collaborative efforts							
Number of collaborations							
a) Local (name, of collaborator, department, institution)							
b) National, International (name of collaborator, institution)							
c) Results from these collaborations	Roberson, Env. Sciences						

<p>9. Services</p> <p>a) Reviewer of manuscripts (list journals)</p> <p>b) Reviewer of proposals (list agencies, foundations...)</p> <p>c) Positions held in professional associations (list position, association)</p> <p>d) Participation in panels, committees of professional, community</p>						
<p>10. Areas of research interests, impact to society, significance major achievements</p>	<p>see below</p>					

Self-study: Professors, research, productivity GRIEBENOW						
Area of evaluation	Academic Year					
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1. Number of publications	5	5	1	6	1	11
2. Number of national and international presentations at scientific meetings	5	4	3	4	6	7
3. Number of local presentations	19	7	2	8	6	23
4. Number of presentations as an invited speaker (list the institution, research institute...)						1 University Mich 1 San Diego
FOR AREA 1 PROVIDE A LIST STATING JOURNAL PAGES, YEAR, TITLE. FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR						
5. Number of grants submitted						
a) Institutional						
b) External	b) 2	b) 1	b) 2	b) 1	b) 1	b) 0
6. Number of grants awarded						
a) Institutional						
b) External	b) 0	b) 1	b) 0	b) 0	b) 0	b) 0
State amount awarded/year agencies						
7. Number of Patents						
a) Submitted						
b) Awarded	0	0	1	0	0	0
8. Collaborative efforts						
Number of collaborations						
a) Local (name, of collaborator, department, institution)						
b) National, International (name of collaborator, institution)						
c) Results from these collaborations	Roberson, Env. Sciences					

<p>9. Services</p> <p>a) Reviewer of manuscripts (list journals)</p> <p>b) Reviewer of proposals (list agencies, foundations...)</p> <p>c) Positions held in professional associations (list position, association)</p> <p>d) Participation in panels, committees of professional, community</p>						
<p>see below</p>						
<p>10. Areas of research interests, impact to society, significance major achievements</p>						

Honors, awards or recognitions (brief description)

Quora writer #10

Dr. Ana R. Guadalupe

Department of Chemistry – Self Study 2009-2015

My research laboratory interests are three-fold: Bio(Chemical) Sensors, Smart Functional Polymers, and Biomimetics. These research areas are inherently multidisciplinary, and they intersect with the areas of Analytical Electrochemistry, Polymer Chemistry, and Inorganic Chemistry. Currently, we are working in the development and testing of a biosensor for *Pseudomonas aeruginosa* and chemical sensors for the detection of metal ions and amyloids peptides: AB1-40 and AB1-42. Also, we work in the synthesis and characterization of inorganic compounds whose physicochemical properties qualify them for electrochemical labels, redox mediators, and synthetic nucleases/proteases. We also work on the synthesis and characterization of polymers as platforms for the constructions of the sensors, or as smart materials for antimicrobial coatings, and for analytical separations and extraction of biomolecules.

From the NSF-PREM grant, former graduate students Rocío Cardona and Madeline Díaz finished their Ph.D. and went to UPenn for postdoctoral work. Today, Dr. Rocío Cardona is an assistant professor (service contract) at UPR, Bayamón. Also, four undergraduate students -Kenneth Hernández, Arelys Rosado, Jocelyn del Pilar, Yashira Negrón - finished their degree and went to graduate school at Ohio State, Wisconsin-Madison, and Cornell universities. One research associate (Rahul Singal) conducted postdoctoral work and accepted a visiting professorship in the USA. On 2014-2015, Yanira Enríquez completed her dissertation work and, after thesis defense, will be graduating on May 2017. Two undergraduate students - Mónica Navarreto and Andrea López - began graduate studies at Case Western University and Weill Cornell Medical College. Four publications resulted from that grant.

The NSF-PREM project provided the resources for the preliminary work described in the NIH-R21 submitted on October 2016: **Toward an Electrochemical Biosensing Platform for the Detection and Quantification of *Pseudomonas aeruginosa***. The proposed project aims to the development of a biosensor for the detection of *Pseudomonas aeruginosa* based on the ribosylation of eEF2 by ExoA toxin. The detection of pathogens is an exciting area of research, not only because of its health relevance and national urgency, but also because it allows us to expand the research to the fields of proteomics and metabolomics. Our goal is to search for the right sensing elements that when combined in unique ways could be used for the construction of devices to detect a given pathogen with high selectivity, rapidly, and at the levels needed.

Dr. Ana R. Guadalupe

Department of Chemistry – Self Study 2009-2015

2009-2010**María del Mar García Maldonado, Ana R. Guadalupe**

Electrochemical and Spectroscopy Studies of Meldola's Blue, 30th Puerto Rico

Interdisciplinary Scientific Meeting & 45th Junior Technical Meeting, UPR-Mayagüez, March 2010

Yanira Enríquez, Yashira Negrón, Rahul Singhal, Ana R. Guadalupe *Designing a New Generation of Electrochemical Biosensors for the detection of Pseudomonas aeruginosa Exotoxin*, 217th Electrochemical Society (ECS) Meeting, Canada, April 2010

2010-2011**María del Mar García Maldonado, Liz J. Hernández Borrero, Ana R. Guadalupe**

Electrochemical and Spectroscopical Studies on the Physicochemical Interactions of Bovine Insulin and Meldola's Blue, 43rd IUPAC World Chemistry Congress jointed with the 31th

Puerto Rico Interdisciplinary Scientific Meeting & 46th Junior Technical Meeting, Puerto Rico Convention Center, March 2011

2011-2012**Yanira Enríquez, Yashira Negrón, Ana R. Guadalupe**

Development of an electrochemical biosensor for the detection of an ADP-Ribosylation Exotoxin from Pseudomonas aeruginosa. 8th Annual NSF-PREM Meeting, UPR-Humacao, Puerto Rico, November 2011

María del Mar García Maldonado, Liz J. Hernández Borrero, Ana R. Guadalupe

Stripping Square Wave Voltammetry of Meldola's Blue in the Presence of Insulin, 32th

Puerto Rico Interdisciplinary Scientific Meeting & 47th Junior Technical Meeting, UPR-Carolina, March 2012

2012-2013**Yanira Enríquez, Yashira Negrón, Monica Navarreto, Ana R. Guadalupe**

Development of an electrochemical biosensor for the detection of an ADP-Ribosylation Toxin, Exo A from Pseudomonas aeruginosa, 8th Iberoamerican Congress on Sensors (Ibersensor 2012), Embassy Suites Hotel, P.R., October 2012

Yanira Enríquez González, Monica Navarreto, Yashira Negrón, Ana R. Guadalupe

Biosensor for the detection of the ADP-Rybosylation of eEF2 by Pseudomonas aeruginosa, 9th RISE Area Conference: Inflammation and Immune System, Courtyard Marriott, Carolina, P.R., March 2013

María del Mar García Maldonado, Ana R. Guadalupe

Electrochemical Studies of Redox Dyes in the Presence of Insulin Aggregates, 9th RISE Area Conference: Inflammation and Immune System, Courtyard Marriott, Carolina, P.R., March 2013

María del Mar García Maldonado, Ana R. Guadalupe

Electrochemical Studies of Amyloid Structures in the Presence of Ferrocene Derivatives, 33rd Puerto Rico Interdisciplinary Scientific Meeting & 48th Junior Technical Meeting, Universidad del Turabo, March 2013

María del Mar García Maldonado, Ana R. Guadalupe

Amyloid β 1-40: Fibril incubation, Characterization and Electrochemical Studies, Partnerships for Research and Education in Materials Meeting, WESTIN, Arlington Gateway, May 2013

2013-2014

Yanira Enríquez, Andrea López, Monica Navarreto, Madeline Díaz, Ana R. Guadalupe

Development of Electrochemical Biosensors for the Detection of Pathogens, 10th Annual NSF-PREM Meeting, Palmas del Mar-Humacao, Puerto Rico, November 2013

Yanira Enríquez González, Monica Navarreto, Ana R. Guadalupe

Synthesis and Characterization of a Ferrocene-NAAD for the Detection of an Opportunistic Pathogen, Biomedical Research Conference for Minority Students (ABRCMS), Nashville, Tennessee, November 2013

Yanira Enríquez, Andrea López, Madeline Díaz, Ana R. Guadalupe

Electrochemical Detection of Salmonella's DNA Hybridization using Fc-Imidazole, 49th ACS Junior Technical Meeting & 34th Puerto Rico Interdisciplinary Scientific Meeting, UPR-Cayey, March 2014

Giovanni Rodríguez, Johanna Fajardo, Yanira Enríquez, Julio Cedeño, Ingrid Montes, Ana R. Guadalupe

Ferrocenyl chalcones as Precursors for Potential Biosensors, Lilly Academy Technical Forum., March 2014

Yanira Enríquez, Yashira Negrón, Monica Navarreto, Ana R. Guadalupe

An Electrochemical Approach for the Detection of an ADP-Ribosylating Exotoxin A from Pseudomonas aeruginosa, 10th RISE Area Conference: Current Development in Protein-Protein Interaction, Courtyard Marriott, Carolina, Puerto Rico, March 2014

Julio Cedeño, Johanna Fajardo, Giovanni Rodríguez, Yanira Enríquez, Ingrid Montes, Ana R. Guadalupe

Ferrocenyl Chalcones as Potential Precursors for Ferrocene Polymers, 49th ACS Junior Technical Meeting & 34th Puerto Rico Interdisciplinary Scientific Meeting, UPR-Cayey, Puerto Rico, March 2014

Monica Navarreto, Yanira Enríquez, Ana R. Guadalupe

Synthesis of a Ferrocene labeled NAAD for the electrochemical detection of Exotoxin A from Pseudomonas aeruginosa, Physical Education Special Interest Council (PESIC) Conference, Intercontinental Hotel, San Juan, Puerto Rico, April 2013

Yanira Enríquez, Yashira Negrón, Monica Navarreto, Ana R. Guadalupe

Biosensor for the detection of the ADP-Ribosylation of eEF2, NSF PREM Annual Meeting. Washington DC, May 2014

Yanira Enríquez, Uriel Rivera, Andrea López, Mónica Navarreto, Madeline Díaz and Ana R. Guadalupe

Electrochemical Sensors for Applications in Human Health, NSF-PREM 8th Symposium: "Shape, Deformation, and Interaction Effects in Functional Soft Matter, UPR – Humacao, May 2014

2014-2015

Yanira Enríquez, Monica Navarreto, Edna E. Aquino, Ana R. Guadalupe

Development of An Electrochemical Biosensor for Detecting the ADP-Ribosylation of Proteins by Pathogen Toxins, 11th Annual NSF-PREM Meeting, Palmas del Mar, Humacao PR, November 2014

Uriel Rivera, Nicole M. Rivera and Ana R. Guadalupe

Pyrrole/Pyrrole-3-carboxylic Acid Copolymer Matrix for the Development of Metal Ion Sensors, 9th NSF PREM Symposium, UPRH, Humacao, Puerto Rico- November 2014

Enríquez González, Yanira; Navarreto, Monica; Guadalupe Ana R.

Synthesis and Characterization of a ferrocene-modified coenzyme for electrochemical biosensor applications. AAAS 2015 Annual Meeting. San Jose Convention Center, San Jose CA, February 2015

Self-study: Professors, research, productivity							
Prof. A. R. Guadalupe		Academic Year					
Area of evaluation	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
1. Number of publications	0	2	1	0	2	0	
2. Number of national and international presentations at scientific meetings	1	0	0	4	4	1	
3. Number of local presentations	1	1	2	1	5	2	
4. Number of presentations as an invited speaker (list the institution, research institute...)	0	0	1	0	0	0	
FOR AREA 1 PROVIDE A LIST STATING JOURNAL PAGES, YEAR, TITLE. FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR							
5. Number of grants submitted							
a) Institutional	1	0	0	0	0	0	
b) External							
6. Number of grants awarded							
a) Institutional							
b) External	1	0	0	0	0	0	
State amount awarded/year agencies							
7. Number of Patents							
a) Submitted	0	0	0	0	0	0	
b) Awarded							
8. Collaborative efforts							
Number of collaborations							
a) Local (name, of collaborator, department, institution)							
b) National, International (name of collaborator, institution)							
c) Results from these collaborations	2	3	2	2	2	2	2

<p>9. Services</p> <p>a) Reviewer of manuscripts (list journals)</p> <p>b) Reviewer of proposals (list agencies, foundations...)</p> <p>c) Positions held in professional associations (list position, association)</p> <p>d) Participation in pannels, committees of professional, community</p>						
<p>10. Honors, awards or recognitions (a brief description)</p>	0	0	0	0	0	0
<p>11. Areas of research interests, impact to society, significance major achievements</p>	See attached Research Description - word doc					

Dra. Ingrid Montes

Invited Presentations

Synthesis, Characterization and Biological applications of ferrocenyl chalcones 13th Raymond N. Castle Conference, University of South Florida, Tampa, USA, April 2015.

Climate Science Toolkit: A successful project in Puerto Rico, Sara Delgado-Rivera | Maria Rodriguez Guzman; Ingrid Montes-González, 249th ACS National Meeting, Denver, CO, March 25, 2015.

Ferrocenyl Chalcones: A versatile core, Universidad de Concepción, Concepción, Chile, October 2013.

Synthesis and applications of Ferrocenyl Chalcones, Pontificia Universidad Católica, Santiago, Chile, October 2013.

The versatility of Ferrocenyl Chalcones core, Universidad de los Andes, Bogotá, Colombia, September 2013.

Are there any particular challenges faced by women in STEM fields? ADVANCE Networking of Hispanic Women in STEM, San Juan, Puerto Rico, October 2012.

Química Verde -nuestro compromiso, nuestro futuro Universidad Jorge Tadeo Lozano, Bogotá, Colombia, November 2011.

Hispanic Women Underrepresentation in STEM Fields, 241st ACS National Meeting, Anaheim, CA, March 2011.

Life Stories and Educational Techniques: How to Motivate Students to Become Successful Scientists, at the Universidad Tecnológica de Bolívar, Colombia, September 2010.

Hispanic women: How to rise above challenges and move forward? Presidential Symposium: Women Chemists of Color: Staying at the Table Symposium, 240th ACS National Meeting, Boston, August 2010

Chaired/Organized Symposia at Meetings

2011	PI and organizer "Are women still underrepresented in science? IYC Challenge Grant project, 43 rd IUPAC World Chemistry Congress/ 46 th IUPAC General Assembly/ 70 th CQPR Anniversary Conference and Exhibition, Convention Center, San Juan, P.R., August 2011.
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- 2011 Organizer Young Chemistry Ambassador Workshop, 43rd IUPAC World Chemistry Congress/ 46th IUPAC General Assembly/ 70th CQPR Annual Conference and Exhibition, Conventional Center, San Juan, P.R., July 2011.
- 2011 Water Global Experiment Workshop and Booth Organizer, 43rd IUPAC World Chemistry Congress/ 46th IUPAC General Assembly 70th CQPR Annual Conference and Exhibition, Conventional Center, San Juan, P.R., July 2011.
- 2009 General Chair of South East Regional Meeting- American Chemical Society National Meeting, Puerto Rico in Fall 2009.

Collaborators

Mahesh Narayan, University of Texas, El Paso.

Adelfa Serrano, Ph.D., University of Puerto Rico, Medical Sciences Campus.

Dr. Fathi Halaweish from South Dakota State University in Brookings South Dakota.

David Sanabria, Ph.D., InterAmerican University-Metropolitan Campus.

Ana Guadalupe, Ph.D., Department of Chemistry, University of Puerto Rico, Río Piedras Campus.

Ana Guadalupe, Rocío Cardona, Kenneth Hernandez, Laura Pedro, Myrna Otaño, and Ingrid Montes "Electrochemical and Spectroscopical Characterization of Ferrocenyl Chalcones" *Journal of The Electrochemical Society*, **2010**, 157, 104-110.

Jorge Colón, Ph.D., Department of Chemistry, University of Puerto Rico, Río Piedras Campus.

Victor Bonilla, Ph.D., College of Education, Department of Graduate Studies, University of Puerto Rico, Río Piedras Campus.

Reinaldo Berríos, Ph.D., College of Education, Department of Graduate Studies, University of Puerto Rico, Río Piedras Campus.

Francisco Arnaíz, Ph. D., Universidad de Burgos, Spain- Sabbatical 2010-2011.

"La reacción del yodo con el aluminio. Un proyecto para el laboratorio integrado"
 Sara M. Delgado, Ingrid Montes, Ph.D., Francisco J. Arnáiz, Ph.D. XXXIII Reunión
 Bienal de Química de la Real Sociedad Española de Química, Valencia, Spain, July,
 2011.

ACS

- | | |
|----------------|--|
| 1989 - Present | Board Member, American Chemical Society Puerto Rico L
Section

Chairperson (2011)

Councilor (1998 – 2013) |
| 1989 — Present | National Chemistry Week (NCW) Coordinator – Puerto Rico Sect |
| 2008 – Present | Chemists Celebrate Earth Day (CCED) Coordinator – Puerto
Section |
| 2009 – Present | Project Seed Coordinator |
| 1989 – Present | Faculty Advisor of UPR-RP Student Chapter of the Amer
Chemical Society. The Chapter has been recognized as
Outstanding Chapter in 1993, 1994, 1995, 1996, 1998, 1999, 2
2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2
2013, 2014 and as Commendable in 1997. |
| 2001 – 2009 | Member of the American Chemical Society, Society Committe
Chemical Education. |
| 2002 – 2009 | Member of the American Chemical Society Chemical Educat
Division (National Meetings Program Committee) |
| 2006 – 2011 | Member of the American Chemical Society, Advisory Boar
ChemMatters Magazine. |
| 2007 – 2009 | Chair of the American Chemical Society, Advisory Board |

ChemMatters Magazine

2007 - 2009	Chair of the American Chemical Society Committee on Community Activities.
2008 – Present	Member of the American Chemical Society Chemical Education Division (Long Range Planning Committee).
2009	General Chair of South Eastern Regional Meeting – American Chemical Society National Meeting, Puerto Rico in Fall 2009
2009 – 2011	Chair of the American Chemical Society Theme Team for International Year of Chemistry celebration.
2009 – 2011	Representative of the American Chemical Society at the IU 2011 Organizing Committee
2009 – 2011	Chair of the Outreach Committee at the IUPAC 2011 Organizing Committee
2010 – 2012	Member of Committee on Committees – American Chemical Society
2010	Consultant, Committee on Community Activities
2011 – Present	Chair of the Long Range Planning Committee – Division of Chemical Education
2013	Director at Large – Board of Directors, American Chemical Society
2015	Executive Committee for the ACS Scholars Program 20 th Anniversary
2015	Coordinator for Webinar in Spanish

Editorial Boards

- 2014 – Present Member of the Editorial Advisory Board, Revista Educación Quím
- 2010 – Present Member of the Editorial Advisory Board, Journal of Chemical Education
- 2006 – 2011 Member of the American Chemical Society, Advisory Board ChemMatters Magazine
- 2007 – 2009 Chair of the American Chemical Society, Advisory Board ChemMatters Magazine

Honors and Awards

- 2013 – 2015 Director-at-Large, Board of Directors, American Chemical Society
- 2013 Honorary Member, Golden Key International Honour Society
- 2011 2012 American Chemical Society Volunteer Service Award
- 2010 Fellow ACS (American Chemical Society)
- 2009 Nominated for the 2009 U.S Professors Years Program sponsored by CASE

Research Interest

Organometallic Chemistry

Ferrocene has attracted the attention of scientists because of its numerous uses in chemical sensing, asymmetric catalysis, and in material science. Its derivatives have many applications, which include optical devices, redox mediators for enzyme sensors, biofuel cells, and the synthesis of biological active drugs. Our research explores the synthesis and characterization of various ferrocene derivatives, mainly based on ferrocenyl chalcones core, and to study their potential applications including molecular materials, as redox-sensors, polymers and in drug design.

Chemical Education

Our research work is based upon the theoretical perspective building on constructivist and meaningful learning theory. In this respect, the construction of knowledge will therefore depend on the interaction of personal experiences with private understandings. As educators, we must be aware of student understandings and provide the adequate environment and opportunities for students to more easily create and retrieve appropriate conceptions. Our research includes three intertwined branches: the instruction (transmission of attitudes, skills and habits of inquiry to students), the practice (development of the tools and methods used to teach chemistry) and the assessment.

Outreach

Development and Implementation of the "Festival de Química" for the American Chemical Society (ACS)

The "Festival de Química" is a community outreach event that, through demonstrations, emphasizes the importance of chemistry in daily life. The event was initially designed, developed and implemented in Puerto Rico, since 2010 ACS adopted this model to broaden its impact internationally.

It includes training prior to the event using the model "Train the trainers" for those who will work as volunteers, manual for volunteer, manual for outreach coordinator

and flash cards for participants.

Each event reaches out from 300 up to thousands children and students.

- Ongoing event in Puerto Rico since 2005 (National Chemistry Week and Chemists Celebrate Earth Day)
- "29th Congreso Latinoamericano de Química (CLAQ 2010)", Cartagena, Colombia, September , 2010
- "IUPAC World Congress", San Juan, Puerto Rico, July, 2011.
- "30th Congreso Latinoamericano de Química (CLAQ 2012)", Cancún, México, October, 2012.
- "Open House" Universidad de los Andes, Bogotá, Colombia, September, 2013.
- "Semana Nacional de la Ciencia y la Tecnología" by CONICYT (Consejo Nacional de Ciencia y Tecnología); Pontificia Universidad Católica de Chile, Santiago, October, 2013.
- "Open House" at the Universidad de Concepción, Concepción, Chile, October, 2013.
- "Chinese Chemical Society Meeting", Beijing, China, August 2014.

Dra. Dalice M. Piñero

List of publications (July 2014 - June 2015)

Alejandra Montanez, Dalice M. Piñero, José A. Prieto

“Crystal structure of (-)-(2R,3S,4R,5R)-5-(1,3-dithian-2-yl)-3-methyl-1-(triisopropylsilyloxy)hexane-2,4-diol” Acta Cryst., 2014, E70, o1285–o1286.

List of presentations by your students (July 2014 - June 2015):

Keily Gutierrez: 4th Congress of Graduate Studies organized by the “Decanato de Estudios Graduados e Investigación” of title: **□ Síntesis de 2'-hidroxi-1'-acetonaftona y 2'-hidroxi-3'-acetonaftona: 2 intermediarios útiles para la síntesis de magnetos moleculares**

Nataniel Medina has presented his work “Bulk synthesis of TCNQ radical anion salts: Development of Paramagnetic linkers”:

- ACS Junior technical meeting at UPRRP, April 2015; Oral Presentation
- 3er Encuentro Subgraduado de Investigación y Creación; Poster

List of your presentations (July 2014 - June 2015):

- 1- Invited speaker of the Crystallography Symposium at the 73rd Conference and Exhibition of the PR Chem 2014 organized by the Colegio de Químicos de Puerto Rico. The title of my talk was **“Tailoring new cyanide linked 3d and 3d-4f metal complexes from common amine based ligands: A crystallographic view”**.

List of your Natural Sciences collaborators during July 2014 - June 2015:

Dr. José Prieto
Dr. Luis Fonseca

Academic achievements and distinctions for the period July 2014 - June 2015:

Project/Proposal Title: Multimodal theranostic nanoprobe for non-invasive bioimaging and photothermal treatment of cancer

(this proposal)

Source of Support: IFN/Epscore/NSF

Total Award Amount: \$200K

Total Award Period Covered: 03/01/2015-
02/28/2017

Prof. José A Prieto

Publications in Peer-Reviewed Journals (2009-15)

39. "Crystal structure of (–)-(2R,3S,4R,5R)-5-(1,3-dithian-2-yl)-3-methyl-1-(triisopropylsilyloxy)hexane-2,4-diol", Cruz-Montanez, A.; Piñero Cruz, D. M.; Prieto, J. A., *Acta Cryst.* **2014**, E70, 1285–1286.
38. "Regiocontrolled Ring Opening of Monoprotected 2,3-Epoxy-1,4-Diols by Using Alkynyl Aluminum Reagents: Synthesis of Differentially Monoprotected Alkynyl Triol Derivatives", Prieto, J. A.;* Rentas Torres, J.; Rodríguez-Berrios, R. R., *Synlett* **2014**, 25, 433-437 (doi: 10.1055/s-0033-1340332).
37. "Aluminum Alkoxide Complexes from Highly Substituted 3,4-Epoxy Alcohols: An NMR and Computational Study", Torres, G.; Ishikawa, Y.; Prieto, J. A.* *J. Phys. Org. Chem.* **2012**, 25, 1299-1305. (doi: 10.1002/poc.3024)
36. "Synthesis of Stereotetrads by Regioselective Cleavage of Diastereomeric MEM-Protected 2-Methyl-3,4-epoxy Alcohols with Diethylpropynyl Aluminum", Torres, W.; Torres, G.; Prieto J. A.* *Synlett* **2012**, 23, 2534-2538 (doi: 10.1055/s-0032-1317316).
35. "Concise epoxide-based synthesis of the C14–C25 bafilomycin A1 polypropionate chain", Valentín, E. M.; Mulero, M.; Prieto, J. A. *Tetrahedron Lett.* **2012**, 53, 2199-2201. (doi: 10.1016/j.tetlet.2012.02.067)
34. "Stereoselective VO(acac)₂ Catalyzed Epoxidation of Acyclic Homoallylic Diols. Complementary Preparation of C2-Syn-3,4-Epoxy Alcohols", Rodríguez-Berrios, R. R.; Torres, G.; Prieto, J. A. *Tetrahedron* **2011**, 67, 830-836. (doi:10.1016/j.tet.2010.11.079)
33. "Stereoselective construction of all-*anti* polypropionate modules: Synthesis of the C5-C10 fragment of streptovaricin U", Torres, Wildeliz; Rodríguez, Raul; Prieto, José, *J. Org. Chem.* **2009**, 74, 2447-2451. (doi: 10.1021/jo8026966).

Invited Presentations and Seminars (2009-15)

25. "Non-aldol Approach for Polypropionate Construction: Stereo- and enantioselective epoxide-based Methodologies", José A. Prieto, Saint Jude Children Hospital, 2016 Chemical Biology and Therapeutics Seminar Series, January 14, 2016, Memphis, TN.
24. "Non-aldol Approach for Polypropionate Construction: A Second-Generation Epoxide-based Methodology", José A. Prieto, Florida International University, Graduate Seminar Program, October 18, 2014, Miami, FL.
23. "Non-aldol Approach for Polypropionate Construction: A Second-Generation Epoxide-based Methodology", José A. Prieto, University of South Florida, Graduate, Graduate Seminar Program, October 16, 2014, Tampa, FL.
22. "Concise non-Aldol Approach for Polypropionate Construction: A Reiterative Epoxide-Based Methodology", J. A. Prieto*, E. Valentín, G. Torres A. Cruz, Chemistry and Chemical Biology of Natural Products Symposium, Council of Scientific and Industrial Research (CSIR)-Indian Institute of Chemical Technology (IICT), August 1-4, 2012, Hyderabad India.
21. "Polypropionate Antibiotics via Oxirane Chemistry" José A. Prieto, El 44º Congreso Mexicano de Química, September 26-30, 2009, Puebla, Mexico.

20. "Epoxide methodologies for the elaboration of polypropionate natural products", Department of Chemistry and Biochemistry, Florida State University Chemistry Seminar Series, FSU, Tallahassee, FL, Feb. 12, 2009.

Prieto Presentations at Scientific Meetings and Seminars (2009-2015)

46. "Divergent synthesis of the acid and alcohol polypropionate subunits of dolabriferol from a common epoxide precursor", Keyla Morales and José A. Prieto*, 250th ACS National Meeting & Exposition, August 16-20, 2015, Boston, MA

"An Epoxide-based Methodology for the Non-aldol Construction for Polypropionate Synthesis", Keyla Morales, José A. Prieto*, XI International Congress of Scientific Research, June 10-12, 2015, Santo Domingo, Dominican Republic.

46. "Studies toward the synthesis of mycalolide A and Crocacin C polypropionate fragments employing an epoxide-based approach", Jaileen Rentas-Torres, Alejandra Cruz-Montañez, Gerardo Torres and José A. Prieto*, 248th ACS National Meeting & Exposition, August 10-14, 2014, San Francisco, CA

45. "Epoxide Approach for the synthesis of the C14-C25 polypropionate fragment of bafilomycin A₁", Elizabeth M. Valentín Nevárez, Marlenne Mulero and José A. Prieto*, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.

44. "Combined NMR and computational studies on the organoalane mediated cleavage of highly substituted epoxides. Understanding the regioselectivity problem", Gerardo Torres, Yasuyuki Ishikawa and José A. Prieto, 43th IUPAC World Chemical Congress, August 1-5, 2011, San Juan PR.

43. "Second-generation epoxide-based approach for the synthesis of polypropionates", José A. Prieto, Raúl R. Reyes-Berrios, Torres Wildeliz, 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, CA.

42. "Polypropionate Antibiotics via Oxirane Chemistry" José A. Prieto, El 44^o Congreso Mexicano de Química, September 26-30, 2009, Puebla, Mexico

41. "Second-generation epoxide-based synthetic methodology for the elaboration of polypropionate modules", José A. Prieto*, Raúl Rodríguez and Jaileen Rentas, 237th American Chemical Society National Meeting, March 21-26, 2009, Salt Lake City, UT.

Student Presentations in Scientific Meetings (2009-15)

244. "A divergent/convergent epoxide approach towards the synthesis of (-)-dolabriferol", Keyla F. Morales and José A. Prieto*, 71st SWRM (Southwestern Regional Meeting ACS) / 67th SERMACS (Southeastern Regional Meeting ACS) (SERMACS), Memphis, TN, November 4-7, 2015.

243. "Epoxide approach towards the synthesis of the polypropionate acid moiety of dolabriferol", Keyla Morales and José A. Prieto*, 249th ACS National Meeting & Exposition, March 22-26, 2015, Denver, CO.

242. "Synthesis of chiral β -hydroxy- δ -lactones using an epoxide-based methodology", Luis A. Vázquez Maldonado, Elizabeth Valentín, Gerardo Torres, PhD, and José A. Prieto, 247th ACS National Meeting & Exposition, March 16-20, 2014, Dallas, TX.

241. "Epoxide-based methodology for the synthesis of polypropionates", Alejandra Cruz-Montañez, Jeishla L. Meléndez-Matos and José A. Prieto, 43rd National Organic Chemistry Symposium, June 23-27, 2013, University of Washington, Seattle, WA.
240. "Synthesis of chiral β -hydroxy- δ -lactones using an epoxide-based methodology" Luis A. Vázquez-Maldonado, Elizabeth Valentín, Gerardo Torres, José A. Prieto*, 48th Junior Technical Meeting, ACS-Puerto Rico Section, March 9, 2013, Cayey, P. R.
239. "Epoxide-based methodology for the synthesis of stereotetrads in polypropionates: application for the synthesis of natural molecules", Jeishla L. Meléndez-Matos, Alejandra Cruz-Montañez, José A. Prieto*, 48th Junior Technical Meeting, ACS-Puerto Rico Section, March 9, 2013, Cayey, P. R.
238. "Development of a convergent, epoxide-based methodology for polypropionate synthesis: functionalized vinyl iodides as coupling partners for epoxide cleavage", Sebastián Guevara, Elizabeth Valentín, José A. Prieto*, 48th Junior Technical Meeting, ACS-Puerto Rico Section, March 9, 2013, Cayey, P. R.
237. "Studies towards the Synthesis of Dolabriferols using epoxide chemistry", Keyla F. Morales and José A. Prieto*, 36th ACS-PR Section Senior Technical Meeting, December 1, 2012, Ponce, P. R.
236. "General Stereocontrolled Strategy for the Synthesis of the *syn,anti,syn* Stereotetrads using the Ireland-Claisen Rearrangement", Leysa A. López González, Cruz-Montañez, Alejandra, Prieto, José A.*, 36th ACS-PR Section Senior Technical Meeting, November 30, 2012, Ponce, P. R.
235. "General Stereocontrolled Strategy for the Synthesis of *syn,anti,syn* Stereotetrads Using the Ireland-Claisen Rearrangement", Jeishla L. Meléndez-Matos, Alejandra Cruz-Montañez, José A. Prieto*, Annual Biomedical Research Conference for Minority Students 2012 (ABRCMS), San Jose, CA, November 7-10, 2012.
234. "General stereocontrolled strategy for the synthesis of *syn,anti,syn* stereotetrads using the Ireland-Claisen rearrangement", Alejandra Cruz and José A. Prieto*, 244th ACS National Meeting, August 22, 2012, Philadelphia, PA.
233. "The effect of the remote protecting group in the cleavage reaction of 3,4-epoxy alcohols", Luis A. Vazquez, Gabriela Fernández, Gerardo Torres and José A. Prieto*, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.
232. "General Epoxide-Based Methodology for the Synthesis of the Hemiacetal Rings in the Plecomacrolide Family", Elizabeth M. Valentín, Jorge A. Vargas, and José A. Prieto, , 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.
231. "Epoxidation studies as the key step toward the total synthesis of (-)-pironetin", Gerardo Torres, Elizabeth Valentín and José A. Prieto*, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.
230. "Epoxide approach towards the Synthesis of Dolabriferol", Keyla F. Morales, Raúl Rodríguez and José A. Prieto*, 243rd ACS National Meeting, March 25-29, 2012, San Diego, CA.
229. "The Effect of the Remote Protecting Group in the Cleavage Reaction Of 3,4-Epoxy Alcohols ", Luis A. Vazquez-Maldonado, Gerardo Torres and José A. Prieto, 47th Junior Technical Meeting, ACS-Puerto Rico Section, March 10, 2012, Carolina, P. R.
228. "Studies Towards the Synthesis of the C14–C24 Polypropionate Fragment of Formamycin", Jorge Vargas, Jaileen Rentas and José A. Prieto, 47th Junior Technical Meeting, ACS-Puerto Rico Section, March 10, 2012, Carolina, P. R.

227. "Studies toward the synthesis of the polypropionate chain of mycalolide A: Epoxide-based approach", Colón, Valerie; Rentas, Jaileen; Nieves, Yexenia E.; Prieto, José A, 35th ACS-PR Section Senior Technical Meeting, November 3-4, 2011, Dorado, P. R.
226. "Studies toward the synthesis of the polypropionate chain of mycalolide A: Epoxide-based approach", Colón, Valerie; Rentas, Jaileen; Nieves, Yexenia E.; Prieto, José A, 35th ACS-PR Section Senior Technical Meeting, November 3-4, 2011, Dorado, P. R.
225. "Studies towards the synthesis of 3,4-epoxy alcohols as precursor for the *syn-anti-syn* stereotetrad using the Ireland-Claisen rearrangement", Alejandra Cruz and José A. Prieto, 43th IUPAC Word Chemical Congress, August 1-5, 2011, San Juan PR.
224. "Synthetic efforts towards the C14-C25 bafilomycin A₁ polypropionate chain using epoxide chemistry", Elizabeth M. Valentín, Marlenne Mulero, and José A. Prieto, 43th IUPAC Word Chemical Congress, August 1-5, 2011, San Juan PR.
223. "Epoxidation studies as the key step towards the total synthesis of (-)-pironetin", Gerardo Torres, Elizabeth Valentin and José A. Prieto, 43th IUPAC Word Chemical Congress, August 1-5, 2011, San Juan PR.
222. "Studies toward the synthesis of mycalolide A: Epoxide-based approach", Jaileen Rentas-Torres, Yexenia E. Nieves-Quñones and José A. Prieto, 43th IUPAC Word Chemical Congress, August 1-5, 2011, San Juan PR.
221. "Regioselective cleavage of cis-2,3-epoxydiols with alkynylaluminum derivatives: Application to the synthesis of polypropionate chains. Raul R. Rodríguez-Berrios and José A. Prieto, 43th IUPAC Word Chemical Congress, August 1-5, 2011, San Juan PR.
222. "Studies towards the synthesis of 3,4-epoxy alcohols as precursor for the *syn-anti-syn* stereotetrad using the Ireland-Claisen rearrangement", Alejandra Cruz Montañez and José A. Prieto, 42th ACS National Organic Symposium, June 5-9, 2011, Princeton University, Princeton, NJ.
211. "Epoxide-based syntheses of the C14-C25 bafilomycin A₁ polypropionate fragment". Elizabeth M. Valentín Nevárez and José A. Prieto, 42th ACS National Organic Symposium, June 5-9, 2011, Princeton University, Princeton, NJ.
220. "Epoxide-based approach: Studies toward the synthesis of mycalolide A", Jaileen Rentas-Torres, Yexenia E. Nieves-Quñones, José A. Prieto, 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, CA.
218. "Epoxide-based syntheses of the C14-C25 bafilomycin A₁ and C6-C16 elaiolide polypropionate fragments", Elizabeth M. Valentín-Nevárez, José A. Prieto PhD, 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, CA.
217. "Boron alkoxide mediated cleavage of 3,4-epoxy alcohols with organometallic reagents", Karla M Ramos, Gerardo Torres, José A Prieto PhD, 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, CA.
216. "Effects of the remote protecting group in the cleavage of 3,4-epoxy alcohols", Gabriela Fernandez-Cuervo, Elizabeth Valentin, Gerardo Torres, Jose A. Prieto, 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, CA.

215. "Stereoselective preparation of a *syn,anti* epoxysilane fragment using different epoxidation methods" Jaileen Rentas Torres and José A. Prieto, 239th American Chemical Society National Meeting, March 21-21, 2010, San Francisco, CA.
214. "Epoxidation studies as the key step toward the total synthesis of (-)-pironetin", Gerardo Torres and José A. Prieto, 239th American Chemical Society National Meeting, March 21-21, 2010, San Francisco, CA.
213. "Progress towards a convergent, epoxide-based approach to polypropionate synthesis", Elizabeth Valentín, Marlenne Mulero, Wilnelia Dávila, and José A. Prieto, 239th American Chemical Society National Meeting, March 21-21, 2010, San Francisco, CA.
212. "Enantio- and stereoselective synthesis of *syn,anti,trans*-2-methyl-3,4 epoxy alcohols as precursors for the key *syn,anti,syn* stereotetrad", Alejandra Cruz, Kellymar Rosa-Perez and José A. Prieto, 239th American Chemical Society National Meeting, March 21-21, 2010, San Francisco, CA.
211. "Toward the synthesis of the lankanolide polypropionate chain: Application of a second-generation epoxide-based methodology" Rodríguez Berrios, Raúl R. and Prieto, José A, 61th ACS Southeastern Regional Meeting, October 21-24, 2009, San Juan, PR.
210. "Stereoselective preparation of a *syn,anti* epoxysilane fragment using different epoxidation methods", Rentas Torres, Jaileen; Prieto, José A., 61th ACS Southeastern Regional Meeting, October 21-24, 2009, San Juan, PR.
209. "Epoxidation studies as the key step toward the total synthesis of (-)-pironetin", Gerardo Torres, and José A. Prieto, 61th ACS Southeastern Regional Meeting, October 21-24, 2009, San Juan, PR.
208. "Progress towards the convergent, epoxide-based synthesis of the C14 – C25 polypropionate chain of Bafilomycin A₁", Elizabeth Valentín, Marlenne Mulero, and José A. Prieto, 61th ACS Southeastern Regional Meeting, October 21-24, 2009, San Juan, PR.
207. "Enantio- and stereoselective synthesis of *syn,anti,trans*-2-methyl-3,4 epoxy alcohols as precursors for the key *syn,anti,syn* stereotetrad" Alejandra Cruz, Kellymar Rosa, José A. Prieto, 61th ACS Southeastern Regional Meeting, October 21-24, 2009, San Juan, PR.
206. "Convergent epoxide-based approaches for the synthesis of the C15–C25 bafilomycin A₁ polypropionate chain", Elizabeth Valentín, Marlenne Mulero, Kellymar Rosa, and José A. Prieto, 237th American Chemical Society National Meeting, March 21-26, 2009, Salt Lake City, UT.
205. "Grignard-Based Epoxide Coupling Methodology: Application to Polypropionate Synthesis", Kellymar Rosa-Pérez, Elizabeth Valentín and José A. Prieto, 237th American Chemical Society National Meeting, March 21-26, 2009, Salt Lake City, UT.
204. Stereoselective epoxidation of acyclic homoallylic alcohols using VO(acac)₂ under microwave irradiation: Synthetic applications to polypropionate synthesis; Rodríguez Berrios, Raúl R., Torres, Gerardo and Prieto, José A, 237th American Chemical Society National Meeting, March 21-26, 2009, Salt Lake City, UT.

Self-study: Professors, research, productivity						
Prof. JA Prieto	Academic Year					
Area of evaluation	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1. Number of publications	1	1	2	0	2	0
2. Number of national and international presentations at scientific meetings	4	12	8	1	2	4
3. Number of local presentations	0	4	4	3	0	0
4. Number of presentations as an invited speaker (list the institution, research institute...)	(2) 44o Congreso Mexicano de Química, Puebla, Mexico and Florida State University, Tallahassee, FL		(1) Indian Institute of Chemical Technology (IICT), Hyderabad India	(2) Florida International University, Miami, FL and University of South Florida, Tampa, FL		
FOR AREA 1 PROVIDE A LIST STATING JOURNAL PAGES, YEAR, TITLE. FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR						
5. Number of grants submitted						
a) Institutional						
b) External	a) 1 and b) 0	0	0	0	0	0
6. Number of grants awarded						
a) Institutional						
b) External						
State amount awarded/year agencies		a) 1, Direct cost: \$900.00.	0	0	0	0
b) 0						
7. Number of Patents						
a) Submitted						
b) Awarded	0	0	0	0	0	0

8. Collaborative efforts Number of collaborations a) Local (name, of collaborator, department, institution) b) National, International (name of collaborator, institution) c) Results from these collaborations		0	0	0	0	0	0
9. Services a) Reviewer of manuscripts (list journals) b) Reviewer of proposals (list agencies, foundations...) c) Positions held in professional associations (list position, association) d) Participation in pannels, committees of professional, community	NSF Organic Synthesis (OMC) proposal review panel member. 2010-present., Member Scientific Committee of the Iberoamerican Chemical Congress (SIBEAQO) since 2007. Member Organizing Committee 2009 ACS Southeastern Regional Meeting (SERMACS)	Member of the Organizing and the Scientific Committee of the IUPAC 2011 World Chemical Congress	Regular reviewer Journal of Organic Chemistry, Letters, Tetrahedron and Tetrahedron Letters to present	Regular reviewer Journal of Organic Chemistry, Letters, Tetrahedron and Tetrahedron Letters to present	Regular reviewer Journal of Organic Chemistry, Letters, Tetrahedron and Tetrahedron Letters to present	Member Editorial Board of "Revista (IN)Genios". (2014-present)	0
10. Honors, awards or recognitions (a brief description)		0	0	0	0	0	0

Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.	Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.	Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.	Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.	Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.	Organic and organometallic synthesis, and medicinal chemistry. The development of new methodologies for the synthesis of biologically active compounds. Lewis acid catalysis. The development of new methodologies for the chiral synthesis of polypropionates based on oxirane chemistry.
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11. Areas of research interests, impact to society, significance major achievements

Prof. A. Tinoco		Self-study: Professors, research productivity	
Area of evaluation		Academic Year	
		2012-13	2013-14
1. Number of publications	1	1	1
2. Number of national and international presentations at scientific meetings	0	1	2
3. Number of local presentations	3	1	1
4. Number of presentations as an invited speaker (list the institution, research institute...)	1. University of Puerto Rico-Rio Piedras RISE Seminar Series, San Juan, PR, September 2012. 2. University of Puerto Rico-Rio Piedras Graduate Chemistry Seminar Series, San Juan, PR, September 2012. 3. University of Puerto Rico-Nayagayaz Chemistry Department Seminar Series, Mayaguez, PR, October 2012. FOR AREA 1 PROVIDE A LIST STATING JOURNAL, PAGES, YEAR, TITLE, FOR AREA 2 PROVIDE A LIST STATING THE CONFERENCE YEAR	1. Oklahoma State University Chemistry Departmental Seminar Series, Stillwater, OK, March 2014. 2. University of Puerto Rico-Cayey Chemistry Departmental Seminar Series, Cayey, PR, April 2014. 3. Southern Methodist University Chemistry Departmental Seminar Series, Dallas, TX, May 2014.	1. University of Puerto Rico-Rio Piedras Biology Graduate Seminar Series, San Juan, PR, August 2014. 2. American Chemical Society, Denver, Colorado March 2015.
5. Number of grants submitted a) Institutional b) External	a) 1 b) 2	a) 0 b) 1	a) 1 b) 1
6. Number of grants awarded a) Institutional b) External State amount awarded/year agencies	a) SCORE, \$20,000, 2012-13. b) The Puerto Rico Science, Technology, and Research Trust, \$300,000, 2013-14	b) NIH DCI, \$1 million, 2014-2018	a) EIP, \$15,000, 2015-16
7. Number of Patents a) Submitted b) Awarded	0	0	0
8. Collaborative efforts Number of collaborations a) Local (name of collaborator, department, institution) b) National, International (name of collaborator, institution) c) Results from these collaborations	a) Raphael Rapin, Chemistry, UPR RP and Florida International University, (2012-current), Development of MRI Contrast Agent. b) Anne Mason, Biochemistry, University of Vermont, UREA Gel Analysis for Protein Stability	a) Kai Grebenrow, Chemistry, UPR RP, Published manuscript	b) Nick Nomial, Biological Sciences, Purdue University, Crystal structure of Titanium Transferrin. Alex Lippert, Chemistry, Southern Methodist University, Synthesis of Fluorescent Citrate
9. Services a) Reviewer of manuscripts (list journals) b) Reviewer of proposals (list agencies, institutions...) c) Positions held in professional associations (list association, association) d) Participation in panels, committees of Professional community	a) Anti-Cancer Agents in Medicinal Chemistry, Crystal Growth & Design, Current Pharmaceutical Analysis: Inorganic Chemistry International Scholars Journals, Journal of Inorganic Biochemistry, Nature Scientific Reports: The Chemistry Society of Ethiopia, I have reviewed these journals throughout my three years. b) Biopro-Medica, Cure COCUNO, Irazat Science Foundation, Research Foundation, Flaunder's c) None yet d) Puerto Rico Junior Technical Meeting Facilitator (All three years)		
10. Areas of research interests, impact to society, significance major achievements	a) Biogenic Chemistry, Metals in Medicine b) Development of a new metal-based anticancer drug design and determination of novel roles played by serum transferrin in metal activity regulation c) Discovered Tl(V) inhibition of iron-dependent metabolic pathways		

Publicaciones Profesores

2009-2010 → 0

2010-2011 → ~~67~~ total 67

Arce 3
Chen 12
Cabrera 21
Carballeira 4
Colón 3
Díaz Vázquez 1
Gnebenow 4
Ishikawa 10
Guadalupe 1
Montes 1
Prieto 1
Quirones 1
Raptis 2
Rivera 3

2011-2012 → Total 60

Adam 1
Cabrera 7
Carballeira 4
Chen 21
Colón 3
Gnebenow 5
Ishikawa 10
Prieto 2
Soderquist 1
Raptis 4
Rivera 2

2012-2013 → Total 42

Rivera	1
Negrón	1
Griebenow	6
Piñero	5
Chen	19
Carballeira	5
Colón	4
Rodríguez	2

2013-2014 → Total 59

Tinoco	2
Rodríguez	6
Weiner	11
Cabrera	21
Montes	1
Colón	1
Rivera	2
Soderquist	1
Carballeira	8
Prieto	1
Griebenow	4
Piñero	1

2014-2015 → Total 77

Colón	4
Betancourt	1
López	1
Chen	34
Nicolau	1
Prieto	1
Carballeira	4
Soderquist	2
Fulvio	4
Piñero	1
Griebenow	9
Weiner	15

Promedio

$$\frac{67 + 60 + 42 + 59 + 77}{5} = 61\%$$

Appendix 6

University of Puerto Rico
Río Piedras Campus
Faculty of Natural Sciences
Department of Chemistry
Graduate Program

REGULATIONS

These rules apply to studies directed toward the degrees of MSc and PhD in Chemistry. These regulations have been approved by the Faculty of the Chemistry Graduate Program on **April 29, 2009**, 2009 and are consistent with the Certification 72 (1991-92) of the Academic Senate of the University of Puerto Rico, Río Piedras Campus.

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I. Mission and Profile of the Graduate Program in Chemistry

A. Program Mission

The graduate students of the Graduate Program in Chemistry at the University of Puerto Rico, Río Piedras Campus, will develop their professions in an educational or industrial setting in Puerto Rico or at the international level. Graduates are expected to contribute to the economic, social and cultural development of Puerto Rico. Therefore, the mission of this Program is to prepare professionals with fundamental knowledge in chemistry and also to provide them with sufficient experience in a specialized area of chemistry. The preparation of professionals in chemistry at an advanced level involves the capacity to recognize important problems in the discipline and to design new solution strategies. In a broader context, the mission of the Graduate Program is to train professionals to practice their profession with the firm purpose of providing advanced knowledge in chemistry, thereby contributing solutions to our daily problems. The graduate students from this Program will work within their profession with the highest ethical principles, so that future generations can look upon them as an example of excellence.

B. Profile of the Program

The Graduate Program in Chemistry began offering a master degree in 1961, and in 1968 began to grant the doctoral degree. Currently, 161 doctoral degrees and 173 master degrees have been awarded. These graduate students work in diverse academic fields, such as academic research or industrial manufacturing, in Puerto Rico as well as abroad. In recent years, the Graduate Program has maintained an enrollment of approximately one hundred students, of which 50% are pursuing the doctoral degree. Approximately, 20% of our graduate students are international (Caribbean, South America and China), and this contributes to the scientific and cultural diversity of our Graduate Program. There are also a significant number of postdoctoral associates as well as undergraduate students with research assistantships. The graduate students of the Program use state-of-the art instrumentation laboratory equipment. Specialized degrees are awarded in the following areas: analytical, biochemistry, inorganic, organic, and physical chemistry. The Faculty actively searches for external funds and has improved the facilities with these funds, as well as with an increase in research assistantships and grants for graduate students. The number of annual research publications is also on the rise.

II. ADMISSION TO THE GRADUATE PROGRAM IN CHEMISTRY

A. Eligibility for Admission

The applicant must have a bachelor's degree or its equivalent with an overall undergraduate grade point average of no less than 3.00 and no less than 2.75 in chemistry. The applicant must have completed a one year course in general chemistry, organic chemistry and physical chemistry, including laboratory work, and have at least one semester of analytical chemistry (including laboratory) and inorganic chemistry. The applicant must also have knowledge of mathematics through integral calculus, and one year of general physics. It is highly recommended that the applicant have conversational abilities in Spanish and English given that courses are often offered in both languages.

B. Application Process

To be considered for admission in August of the academic year, the applicant must submit the following materials to the Graduate Program Coordinator no later than February 28 of the year he or she is applying for admission.

1. The application form can be obtained in the Graduate Program Office, Facundo Bueso Building, room FB 264, second floor.
2. Transfer, Readmission or Reclassification Application forms as needed.¹
3. Three (3) official transcripts which include a degree certification.
4. Results of the Graduate Record Examination (GRE). The applicant can also submit evidence that he or she has applied for the exam. The student will be responsible for submitting the scores to the Graduate Program Office.
5. Three (3) letters of recommendation from professors at the university where the student earned the bachelor's or master's degree.
6. Statement of Purpose indicating the student's interests in pursuing graduate studies.
7. Personal interview (if requested by the Admissions Committee).

The applicant will be notified by mail regarding acceptance to the Program no later than April 1st.

C. Conditional Admission

An applicant who fails to fulfill one or more of the admission requirements, but who otherwise shows promise as a graduate student, may be granted conditional admission to the Graduate Program. To be considered for conditional admission it is required that the student has a general minimum grade point average of 2.75 and a 2.50 in chemistry. In this case, the applicant will be informed of the conditions that he or she must satisfy to be considered a regular bonafide student. Conditional admission means

¹ The **Transfer** form is for students that come from accredited private universities in or outside Puerto Rico. The **Reclassification** form is for students who has graduated from the Río Piedras Campus of the University of Puerto Rico and are applying for admission to the Graduate Program the next semester following graduation. The **Readmission** form is for students that interrupt their studies for one or more semesters, students that obtain their bachelor degree at a campus of the University of Puerto Rico, or students that started their undergraduate studies at the Río Piedras Campus of the University of Puerto Rico, but finished their bachelor degree in an accredited private institution.

that the student will be on probation for a period of one year until he or she demonstrates academic progress. The Admission Committee will advise the student on the development of a class program that complies with these requirements. The Graduate Affairs Committee will determine if the student has fulfilled all conditions established by the Admission Committee after the first year of study. A student who does not satisfy the admission conditions during the allotted time will be dropped from the Program.

D. Transfer Credits

Only graduate courses (or their equivalents) approved with A or B, taken within five years prior to the date of entrance to the Graduate Program can be considered for transfer credits. To apply for the acceptance of transfer credits the student should submit to the Chemistry Graduate Program Coordinator an official copy of his academic record and a copy of the form "Request for Credit Validation", as well as a description of the courses according to the University catalog where the graduate courses were taken. The form "Request for Credit Validation" can be obtained in the Chemistry Graduate Program Office. A maximum of a third ($1/3$) of the course credits required for the corresponding M.Sc. or Ph.D. that were earned at another institution can be accredited, or as determined by the Graduate Affairs Committee. Graduate courses taken at the Río Piedras Campus before admission to the Graduate Program may be counted toward the total number of credits earned. The student must present the Graduate Program Coordinator with a letter from the Registrar in which it is stated that such courses were not used to fulfill the requirements of the B.Sc. degree.

E. Placement Exams

Once admitted, the student must take the placement exams given by the Chemistry Graduate Program. These exams are used to determine the strengths and possible deficiencies of the incoming graduate student in the four basic areas of chemistry, namely: analytical, inorganic, organic and physical chemistry. Results will also help the Graduate Program Coordinator in planning the graduate and/or undergraduate courses that the student must take during his or her first year of studies. Final recommendations will be coordinated with each Division as they will determine the score for each placement exam. These exams will be offered a week before the beginning of classes. All first year students must take these exams as it is an indispensable requirement for registration in the Program. Nonresidents should make arrangements to be in Puerto Rico the dates of these exams. If there is a deficiency in a given area, the student will have the option to take the undergraduate course (2 semesters) or a graduate class (1 semester) in that area. If the student decides to take the undergraduate course, he or she must attend classes, and comply with assignments and exams given by the professor. It is not necessary to register in the course or perform the laboratory work. However, the student should get an A or B in the course and he or she will request the professor to notify the Graduate Program Coordinator by letter of the grade obtained in that course. This course will not count as part of the requirements for advanced degrees. If, instead, the student decides to take any semester of a graduate class it should be passed with either A or B. The graduate course, however, will count as an elective for advanced degrees. The deficiency can be removed at any time during the graduate career, but this should be done at least one semester before graduation. If the student wishes to concentrate in an area where he or she has a deficiency, he or she should take a one year modular course in this area and obtain an average grade point average not less than 3.00 between the two semesters.

F. Language Requirements

All students registered in the Program should have a working knowledge of both Spanish and English. This is recommended since most teaching is done in Spanish, while the textbooks, scientific articles and references are in English. Moreover, most of the undergraduate teaching is done in Spanish. A student with a language deficiency can be admitted to the Program with the condition that he or she takes language courses that will help the student surmount this deficiency during his or her first year of studies. The Department of Chemistry can coordinate these courses with the College of Humanities and/or General Studies.

III. DEGREE REQUIREMENTS

A. Degree Candidacy

A student who wishes to obtain a graduate degree must first be admitted as a candidate of the degree by the Chemistry Graduate Faculty. Advancement to candidacy means that the student has demonstrated that he or she is capable of fulfilling the requirements for the degree and has sufficient training to pursue independent research.

B. Master's in Chemical Sciences

1. Courses: The student must complete a minimum of 21 credits in graduate courses.

The requirement of graduate courses can be fulfilled as follows:

- 12 credits in core courses (6000 level)
- 6 credits in electives (6000 or 8000 level)
- 3 credits in the area of specialization (8000 level)

2. Qualifying Exams: At the end of the first year of graduate studies the student must pass two written qualifying exams, one of which must be in the area of specialization.

3. Proposal A (Research work plan): In this proposal the student must present his or her research plans to the thesis committee.

4. Seminar: A satisfactory (A or B) oral presentation of the student's thesis work will fulfill this requirement.

5. Group seminars: The student must register and attend research group seminars every academic semester. A minimum of six credits must be approved in his or her research area. These credits are in addition to the 21 credits required for the degree. (See B1).

6. Graduate Research: A minimum of six credit hours of research must be taken. Based on this work, the student must write and defend an acceptable thesis to the Department of Chemistry.

7. Teaching Assistant: The student must fulfill a minimum requirement of a year as a Teaching Assistant. The student must also register in the course Principles and Practices of Chemistry (Q 6905-6906; 6 credits) and fulfill all the requirements of this course.

8. Advancement to Candidacy: Advancement to candidacy for the MS degree will take into

consideration the performance in courses, the qualifying exams taken at the end of the first year of studies, the graduate seminar, the student's research plan and the recommendation of the student advisor. *This requirement should be fulfilled after the second year of graduate studies.*

C. Doctor of Philosophy in Chemistry

1. Courses: The student must complete a minimum of 30 credits in graduate courses distributed as follows:

- 18 credits in graduate courses (6000 level)
- 12 credits in electives, of these 9 credits must be in courses at the 8000 level.

The student should discuss with his or her research advisor before registering in chemistry courses. The research advisor may recommend that the student take courses in other areas such as biology, physics or mathematics, when it is thought that these courses will be necessary for the student's development as a researcher.

2. Qualifying exams: At the end of the first year of graduate studies, the student must pass three written qualifying exams, one in the student's area of specialization.

3. Proposal A (Research work plan): The student must present a research plan to the thesis committee, which will eventually become his or her dissertation.

4. Seminars: A minimum of two satisfactory graduate seminars (A or B) should be presented to the Graduate Faculty. One of these seminars will be the oral presentation of the student's dissertation.

5. Proposal B and *Comprehensive Oral Exam*: The student must present and defend an original written research proposal to the committee. This requirement also includes a comprehensive oral exam in the area of specialization.

6. Group Seminars: The student must register and attend all seminars relevant to his or her research group during his or her academic career. The student should pass a minimum of 12 credits in the corresponding research area. These credits are in addition to the 30 credits required for the degree (See C1).

7. Graduate Research: The candidate must take a minimum of 24 credit hours of graduate research. Based on this work, the student must write and defend a dissertation to the Department of Chemistry.

8. Teaching Assistant: The student should comply with a minimum requirement of one year, and should register in the course: Principles and Practices of Chemistry (Q 6905-6906; 6 credits) and fulfill its requirements.

9. Advancement to Candidacy: In the advancement to candidacy for the degree of Ph.D. the faculty will evaluate the: academic development of the student, qualifying exams taken at the end of the first year of study, graduate seminar, Proposals A and B, and the recommendation of the student's advisor. This requirement should be fulfilled by the end of the third year from the student's first admission to the Program.

IV. Description and evaluation criteria for degree requirements

A. Graduate Courses

The Graduate courses at the 6000 level are offered annually while courses at the 8000 level are normally offered every other year, although these are offered in the five basic areas of Chemistry.

The student should complete a minimum number of graduate courses as described in Section III (A-C.). It is very important that the graduate appropriately student plans his or her years of graduate studies in order to have the courses requirements completed at the time of graduation. The general grade point average must be 3.00 or higher in order to apply for graduation.

B. First Semester Rotations

Students are required to do rotations in three laboratories during the first semester of the first year of study. This will expose them to various research labs and will enable better decisions on which research group to join.

- Students will register in special topics (CHEM 8999, 1 credit)
- Before the end of August of the Fall semester, each faculty member of the Program will make a poster presentation of his/her research interests. The purpose of this activity is to enable the students to make a better decision regarding in which three research groups he/she intends to rotate.
- Students will fill out and turn in to the Program's office Form C3a- CERTIFICATION OF RESEARCH LAB ROTATIONS (Appendix C). This form requires the signatures of the faculty with whom the students will do the rotations.
- Students are strongly encouraged to do one rotation outside of desired area of specialization, but it is optional to do so.
- Duration: The first three weeks of the month of September, October and November. The fourth week the student will prepare and turn in Form C3b-ROTATION REPORT (Appendix C) after the rotation advisor signs and assign the grade (PS/PN/PB/NP).
- The overall grade in the course will be the average of all the three rotations.
- If the student graduated from the UPR-Río Piedras, none of the rotations can be carried out in laboratories in which he/she has already conducted undergraduate research.

C. Graduate Research

All graduate students (M.Sc. or Ph.D.) should form part of a research group before the second semester of the first year of study. It is an indispensable requirement of the Program that the student begin his or her research work as soon as possible and attends research group meetings. For this purpose, all graduate students, bonafide and fulltime, should register in CHEM 8999 (Graduate research) and in the group seminar corresponding to his or her area of study during each academic semester.

D. Qualifying Exams

The qualifying exams are offered at the end of the second semester of the first year at the Program during the months of June and July. The student has two opportunities to pass these exams. Each

department will prepare and distribute a list of topics normally covered in these qualifying exams to the students. Copies of previous exams are normally available for review at the Natural Sciences Library. The student should apply for these exams by filling out form 2. (Appendix C-Form 2) A student in a transitory status or on probation is not authorized to take these exams.

Grading: The exams will be graded on an A, C or F basis. A grade of an A is defined as 60% or higher, a grade of a C is defined as 59-45%, and a grade of an F is defined as 44% or less, in all areas. In order to qualify for the Master's degree a student must pass two qualifying exams with A or C grades, as long as he or she has a grade average of 3.00 or better in the two-semester core course corresponding to the area of each C exam. For example, a student who wishes to major in physical chemistry and passes the physical chemistry exam with an A and the Analytical chemistry exam with a C, should hold an average of B or better in the courses 6215 and 6225 in order to qualify for an M.S.

1. *Master's Program:* The student must take all the qualifying exams requested during the exam period. A student who has not previously completed the modular courses required to take these exams when they are offered, or whose academic average in the modular courses is lower than 3.00, must postpone all the qualifying exams until he or she has taken all the courses or has improved his or her academic grade point average. The Coordinator will authorize the student to take the qualifying exams based on his or her academic average in modular courses and in the number of credits approved in graduate courses. It is the student's responsibility to confirm that his or her name appears on the official list of authorized students that are taking the exams.

2. *Doctoral Program:* Full time students who wish to proceed directly to the doctoral program without obtaining a master degree must pass three qualifying exams at the end of the second semester of the first year. To qualify for the doctoral degree the student must pass two qualifying exams with an A, but one should be in the concentration area. The third exam can be passed with an A or C, but the student should have a combined average of a 3.00 between the two semesters of the modular course (6000 level) corresponding to the exam in which the grade of C was obtained.

3. A student that fails one or more qualifying exams in June has a second opportunity in July of the same year to repeat these exams. If a student does not take the qualifying exam, he or she will automatically fail, unless the Graduate Affairs Committee has granted the student permission not to take it. However, he or she will not have an additional opportunity to fail. Based on the results of these exams and on course performance, the graduate faculty will decide if the student is admitted for candidacy to the master's or doctoral degree. If the student does not pass the required exams after two opportunities the student will be dropped from the Program.

E. Proposal A - The Student Research Plans (M.Sc./Ph.D.)

Before the end of the first semester of the student's second year (third semester) of studies, master and doctoral students, should present a plan of his or her research project to the Thesis Committee. The proposal has both written and oral components. Students should participate in a proposal writing workshop provided by faculty members of the Program.

- The written component will include an introduction (e.g. literature background), statement of the problem, methodology, preliminary results, planned experiments and anticipated research problems with alternatives to resolve them. The written part of the proposal should follow the present format used for proposals sent to the National Sciences Foundation or the National Institutes of Health.

- The deadline to turn in the written document is on the last Friday of October of the student's third semester in the Program. The student should give a copy to each member of his/her thesis committee and to the Coordinator of the Program.
- The students have to arrange a date to complete the oral component with the members his/her thesis committee. The oral presentation should be notified to the Committee and the Graduate Program Coordinator at least one month prior.
- The oral presentation will be no earlier than two weeks after the Committee has received the written document.
- If necessary (due to extraordinary circumstances and with the approval of the student's Committee) some oral presentations could be scheduled for early in the fourth semester (Spring semester of the second year).

The presentation of this proposal has various purposes, such as familiarizing the student with the literature related to his or her research project, organizing his or her ideas, and obtaining a position from the Committee members at an early stage in the project's development. The proposal also serves to ensure that the student has basic knowledge of laboratory techniques and has made arrangements with the necessary resources to do research and demonstrate that he or she has initiated the research.

F. Graduate Seminars

1. Purpose of the Seminar: The purpose of the graduate seminar is for the student to orally present the essence of a recent topic, demonstrate his or her abilities to find and organize recent information from literature on a new subject matter, and maintain the participants of the Graduate Program informed of recent developments of general interest. All graduate students should register each semester in the Graduate Seminar, specifically in the section corresponding to his or her area of concentration. The registration in these seminars is an indispensable requirement of the Graduate Program for the duration of the student's participation in the Program. Attending all the graduate seminars with invited speakers and professors from the Graduate Program, as well as student seminars corresponding to the student research area, is obligatory. A list of speakers, topics and dates will be posted at the beginning of each academic semester.

2. Seminar Schedule: The professor in charge of Q- 8901- 8902 (Graduate Seminar) will schedule the seminars for each semester, making sure that each student has the opportunity to satisfy the minimum requirements of the graduate seminars. The graduate student's first seminar will be scheduled during the Fall semester of the third year of study (fifth semester) by the professor in charge of the seminars.

- The seminar's subject can not be directly related to the area of research of the student or of one of the members of research group to which he/she belongs.
- **Abstract and Bibliography:** Fifteen copies of a summary (from four to ten pages) with references must be handed in to the Graduate Program Office one week before the seminar. This should not be a complete written version of the seminar. One copy will be kept on file at the Graduate Program Office. The bibliography should include only those references actually consulted by the student. The references must be prepared following the guidelines of the latest edition of "The ACS Style Guide". Alternatively, the student should follow the example of *J. Am. Chem. Soc.* or the ACS journal most closely related to his or her subfield of chemistry.

3. Seminar Evaluation: If a student does not pass his or her first seminar, he or she will be referred to the Graduate Affairs Committee who will decide if the student can present another seminar no later than the following semester. If a graduate student does not pass the seminar requirement, he or she will be dropped from the Program. A copy of the evaluation sheet used by the professors for seminar

evaluation can be found in Appendix B. This form outlines the criteria used in this evaluation and the distribution of points.

G. Proposal B - Original Research Proposal

The student should present and defend an original research proposal no later than the end of the third year of studies (sixth semester). The date to meet this requirement will be in accordance with the student, the research advisor coordinator and his committee. It is the student's responsibility to notify the Coordinator of the Chemistry Graduate Program of the date agreed upon.

The student should discuss the selected topic with his or her committee to make sure that it is appropriate and is approved by the committee. The student will prepare and submit four copies of the complete proposal to his research advisor and committee. The student will prepare and give an oral presentation lasting approximately 20 minutes. Then, the committee will evaluate the student. The committee will also evaluate the student's knowledge of the fundamental concepts of chemistry regarding his or her study area and the topic of the proposal. The committee will evaluate the results of the exam and the academic development of the student before proceeding to prepare the final evaluation. The proposal committee will nominate a president among its members who will communicate any suggestions of improvement to the student (Form C8 in the Appendix). Similar to Proposal A, the written part of the proposal will follow the present format used in the proposal sent to the National Sciences Foundation or the National Institutes of Health.

- Like the seminar, the Proposal's subject can not be directly related to the area of research of the student or of one of the members of research group to which he/she belongs.
- The research advisor of the student will not attend the oral defense of the proposal.
- The oral defense will be done no later than two weeks after the proposal is handed in to the committee members (Form C7 in the Appendix).

H. Thesis or Dissertation

As a result of this research, the student should write, present and defend a thesis or dissertation as a final requirement of the degree.

a. Thesis (or dissertation) manuscript: Once the student has completed a written draft of his or her thesis (or dissertation) containing an abstract, introduction, statement of the problem, experimental section, results, discussion and bibliography, he or she will hand in a copy to his or her research advisor and to each committee member. Simultaneously, the student will present a copy of a publication based on his or her research work. This publication should be come from a journal in which the articles are peer reviewed. This rule may only be exempted in special cases and by a unanimous decision from the student committee.

b. Oral defense: Prior to the oral defense of the dissertation and after handing in the written draft of the thesis (or dissertation) to the committee, the student should present a graduate seminar based on his or her research work. The date selected for the oral defense of the thesis (or dissertation) will be established by unanimous agreement between the student, the research advisor and his or her committee. In the oral defense, the student should do a brief presentation of not more than 15 minutes summarizing his or her research work as well as the results and major contributions to his or her study area. The student will be considered an expert in his or her area and therefore he or she should be able to demonstrate to the members of the committee his

or her knowledge of chemistry, (particularly related to his or her research work) present possible solutions to situations, and future ramifications and problems without solutions within his or her area. If the student committee finds that the defense has not been done at the expected level for the master's or doctoral degree, the student will be granted a reasonable amount of time to study work and defend it for the second and last time.

V. General Procedures

A. Orientation for New Students

New students should attend the Graduate Program's orientations during the week before classes begin. During this period, the student will receive an academic program designed taking into account the results of the entrance exams. Students awarded with a teaching assistantship must attend the training for teaching assistants offered annually during July. Also, all graduated students must attend security trainings for the chemistry laboratories that are offered annually by authorized personnel from the University of Puerto Rico.

B. Registration

The registration of all chemistry graduate students (and other students who are taking chemistry graduate courses) will be done by the Graduate Program Coordinator. To avoid late registration problems, all graduate students will follow a special procedure that will be described during the orientation period. Students continuing in the Program should do pre-registration. The Chemistry Graduate Program will announce the courses that will be offered, place and dates for pre-registration. Before the pre-registration each student will:

1. Discuss his or her academic program with his or her research advisor. The Graduate Program Coordinator will serve as an advisor to students that have not selected their research advisor. All questions or problems related with his or her program should be discussed with the research advisor, the Graduate Chemistry Program Coordinator and/or the Graduate Affairs Committee.
2. Obtain from the Graduate Program Office the form for pre-registration (Appendix, Form C1a). Students who have started research or who are registered in course Chem 8999 or have a research assistantship should also fill out the form Authorization to Register in the Research and Research Progress Report from the Chemistry Graduate Program, (Appendix, Form C1b).
3. Each form must be signed by the research advisor.
4. On the day assigned for the pre-registration process each student will submit the requested forms containing the signatures of the research advisor and the student to the Coordinator.
5. During the period of registration at the beginning of each semester, the student should pick up his or her registration materials according to the schedule announced by the Faculty of Natural Sciences and complete his or her registration with the Registrar and Treasurer.
6. Changes in registration: Changes in registration are discouraged. A graduate student should plan his or her program carefully so that changes will not be necessary. If a student finds that it is

essential to make a change to his or her schedule, he or she should consult the University calendar for the dates assigned for adding or dropping courses. The Coordinator will make the registration changes with the authorization of the student's research advisor. By dropping a modular course the student will automatically enter probationary status. The student will remain on probation until he or she repeats and passes the modular course the next time it is offered.

C. Selection of the Student Committee

The student's committee should be named after the qualifying exams (Appendix, Form C5). This should consist of five members including the student's research advisor, two professors from the corresponding Division and two additional professors from the Graduate Program: one related to the research that the student is carrying out and one that is not. The first three committee members, including the research advisor, are selected by the student with the assistance of his or her research advisor. The two additional members are named by the Coordinator of the Chemistry Graduate Program with the assistance of the Graduate Affairs Committee and with the consent of the student's research advisor. All members should have the approval of the Coordinator and the Graduate Affairs Committee. Any change in the Student's Committee requires the approval of the Coordinator and the Graduate Affairs Committee. (Appendix, Form C6).

Divisions that do not have enough members to meet the requirement will have to make the necessary arrangements for the participation of qualified scientists. In the event that the student or the research advisor requires the participation from an external member of the Graduate Program, this person should be willing to participate in the Committee from the moment of its creation. A member of Student's Committee outside of the Department or Graduate Program should meet the following requirements:

1. Be an active researcher.
2. Present curriculum vitae with recent publications. The curriculum vitae should evidence experience and activity in the research field.
3. The member of the committee should understand the purpose of the evaluation requirement, that is:
 - the student's research plan and the original research proposal or thesis (or dissertation).
 - A copy of the Graduate Program's Regulations will be provided to this member.
4. The Graduate Affairs Committee will approve this member's participation in the Committee.

D. Selection of the Research Advisor

During the first semester, the student should interview researchers from his or her area of interest. At the beginning of the second semester of the first year of studies, the student should select his or her research advisor and attend the group's seminars. It is recommended that the student attend the group meetings or visit the research laboratories in order to make a well-informed selection of the research advisor. Once the student selects the advisor, he or she should fill out form 3. (Appendix, Form C3).

The student should select a research advisor that is a full-time member of the Faculty of the Chemistry Graduate Program. A student that wishes to do his or her research outside the Department of Chemistry must submit a written petition to the Graduate Affairs Committee requesting an authorization to do the research with a non member of the Chemistry Department. This researcher should comply with the requirements for external members. (See section V.C). If the request is approved, a member of the Faculty of the Chemistry Graduate Program will be designed to serve as the student's co-advisor.

The co-advisor will be selected by the student with the approval of the Graduate Affairs Committee and the Coordinator of the Program.

E. Change of Advisor and/or Research Area

If a student decides to change research projects and at the same time change his or her research advisor, the student should complete the form C4 in Appendix. This must be approved by his or her previous research advisor. The student has to complete Form C3. Both forms should be handed in to the Coordinator of the Graduate Program. If the change of thesis advisor involves a significant change in the research area, the change will not be approved until the Coordinator of the Program and the Graduate Affairs Committee complete an analysis of the student's academic file regarding qualifying exams and courses to guarantee that the student qualifies for the new area.

F. Teaching Research Assistantship

Students receiving institutional assistantships or external funds are known as Teaching Assistants or Research Assistants. The student should submit together with the assistantship application two official transcripts of his or her academic record, the medical examination form, an affidavit certifying that he or she does not have any debt with the Government of Puerto Rico. Non-resident students should obtain their social security number in the corresponding government agency as soon as they arrive to Puerto Rico. The Office of Exchange Students will send an I-20 form to non-resident students. Each student with a teaching assistantship should register in Chem 6905-6906, and those with a Research Assistantship must register in Chemistry 8999. The evaluation and course grade for the teaching assistantship will be sent to the Graduate Program and the Registrar by the professor in charge of the course. This evaluation will form part of the student's academic record in the Graduate Program's Office. **All graduate students, regardless of assistantship type (including fellowships) are requested to teach at least two academic semesters.**

The teaching or research assistants perform a combination of research and teaching duties, these include:

1. A research assistantship (without teaching responsibilities) requires a minimum of 20 hours a week of research during each semester of research and fulltime during academic recess.
2. A teaching assistantship requires 18 hours weekly of teaching (including preparation) for two semesters.

The teaching or research assistantships are available only to fulltime graduate student. This means that the student cannot have any other additional job. All graduate students are evaluated each semester by the Graduate Affairs Committee. This evaluation includes academic progress, course grades, progress in research and his or her performance of assistantship duties. If the academic grade point average of the student falls below 3.0 the student will immediately become ineligible for the assistantship in the department. It is the discretion of thesis advisor to provide research assistantship to a student on probation. Any student that has dropped out of the Program also will be automatically ineligible for any assistantship in the Department. Teaching assistantships available during the summer are limited. These will be given to those bonafide students who have good records as teaching or research assistants. **Master students will have a maximum of three years to hold a teaching or research assistantship and five years for a doctorate student.** After this time, the student's progress will be evaluated by the research advisor and committee to decide if it is worthy of an extension, in the event it is needed. Doctoral students that have passed the three qualifying exams will be recommended to receive stipends corresponding to the current salary scale for this degree.

G. Research Thesis/ Dissertation

A graduate student, either master or doctorate, who has fulfilled all the requirements of the degree and has completed the experimental part of their research work, will be able to enroll in the Thesis Continuation course, CHEM 6896 (master) or CHEM 8896 (doctoral), in order to be a student of the University of Puerto Rico when applying for graduation.

H. Graduate Affairs Committee

The Graduate Affairs Committee consists of a professor from each Division of the Faculty Chemistry Graduate Program. This Committee evaluates the academic progress of all graduate students each academic semester together with the Coordinator of the Graduate Program, and decides on matters related to the complying with the regulations.

I. Academic Status

To be considered as a fulltime student, he or she must be registered in nine credit hours during a regular semester and six credit hours during the summer, unless registered in Continuation of Thesis or Dissertation (CHEM 6896 or 8896). It is expected that a first year student takes three graduate courses and a graduate seminar each semester. The student's academic average is computed using course grades as a base, except those that the student has repeated, in this case the best grade will be used to compute the average. Any course with C, D or F grade can be repeated when the course is offered again. If a student receives a grade less than a C (2.00) in any course, it may not be used to satisfy the graduation requirements, even though the grade is included in his or her academic average. A student is considered bonafide if his or her academic average is 3.00 or higher. If the academic average is lower than 3.00 the student automatically goes on probation at the beginning of the next semester. The student is removed from this probationary status as soon as he or she raises the academic average above 3.00. A student with probationary status will neither be eligible to take the qualifying exams nor be able to fulfill other degree requirements, such as graduate seminar or proposals A and B. Nevertheless, the student will be able to continue taking graduate courses, working on research and performing the assistantship depending on the discretion of the advisor. If the student does not meet this condition after having been on probation for one year, he or she will be dropped from the Program. If a student decides to leave the Graduate Program before completing the degree, he or she must submit a copy of Form C10 (Appendix C) to the Coordinator of the Program. If the student resigns from a teaching or research assistantship, he or she must submit the resignation by letter to the corresponding program or Department. A student who is dropped from the Graduate Program due to poor academic performance (GPA below 3.00), may apply for readmission to the Graduate Program only after having satisfied the deficiencies. Therefore, the student can take graduate courses with the approval of the Coordinator of the Graduate Program. The student should present evidence of the work carried out during the subsequent period from which he or she was dropped and also demonstrate that the deficiencies that caused such an action have little probability of appealing. The student should then follow the normal procedure to apply for readmission (Section II.B). A student who is not registered for the semester that he or she wants to be enrolled in, should request readmission to the Graduate Program and to the University. A student who obtained a master degree and decides to continue on with doctoral studies and is an active student, should apply for reclassification to the Program. Reclassification will be on the condition that the student passes the required qualifying exams. The necessary forms (Section IIB) can be obtained in the Office of the Graduate Program and submitted on the dates which are published in the official academic calendar of the University. The dates are usually in September for the second semester (which begins in January) and in February for the summer or

first semester. In situations where these procedures cannot be followed, students should be referred to the Coordinator of the Graduate Program.

All readmissions to the Program will be evaluated by the Graduate Affairs Committee and if necessary, by the Admission Committee. A student with a master's degree who has been readmitted to the Program should apply for an extension to validate that their master's credits can be counted for the doctoral degree. The student should request the form "Request for Extension to Complete Degree Requirements" in the Office of the Graduate Program and present it to the Coordinator of the Graduate Program.

Readmission to the Graduate Program will not be considered if the student has been dropped from the Program as a result of:

1. Not passing the required qualifying exams.
2. Not fulfilling the admission requirements for candidacy in the time limit specified.
3. Not satisfying the of the thesis or dissertation requirements in the time limit specified.

Any violation to the dispositions contained in this Regulation Handbook is sufficient reason to place a student on probation. The probationary status means that the student is not eligible for a teaching assistantship and may not present the qualifying exams, graduate seminar or the proposals A and B. Eventually, if the student does not comply with the conditions of his or her probation during the time established (usually one year), he or she will be dropped from the Program. If there is a justifiable cause for not meeting the conditions, the student must request a postponement by letter addressed to the Graduate Affairs Committee.

J. Student Representatives

Two graduate student representatives will attend all departmental and Graduate Faculty meetings. The student representatives will have a voice, but not a vote. They can request at any moment that the topics of interest to the graduate students be included in the agenda for the graduate faculty's future meetings. The Faculty representatives may be asked to leave the meeting when confidential matters pertaining to a graduate student are discussed. Student representatives will be invited to attend committee Faculty meetings when Graduate Program's issues are discussed. An open meeting to all graduate students from the Program will be announced by the Coordinator at the beginning of each academic year. The student representatives will be elected for that year at this meeting. The student representatives may call for graduate student meetings during the year to discuss problems or plan activities.

K. Graduation

The student will fill out the graduation application in the Registrar's Office during the first week of the semester in which he or she expects to complete all requirements of the degree. At the time of applying for graduation, the student is responsible to have already applied for reclassification, validated courses or extension for the validation of these courses if necessary. It is recommended that the student requests an evaluation of his or her academic record and status in the Graduate Program from the Coordinator of the Program at least one year before graduation. The student is responsible of removing the deficiencies and holding a 3.00 GPA at the time of graduation. Three bounded copies of the thesis or dissertation should be handed into the Chemistry Graduate Program no later than four weeks before the semester ends. Two of these bound copies will be kept at the Library of Natural Sciences and the third one will be kept in the Chemistry Department. An additional copy should be given to the research advisor. It is the student's responsibility to be aware of and meet all the degree

requirements. The Graduate Affairs Committee will advise the student with this task. A certification of graduation will not be given until the student hands in the bounded copies of the thesis or dissertation. It is a requirement of all doctoral students to register their thesis in the international bibliography bank of the University Microfilms Inc.

Appendix A

Master of Science in Chemistry: Suggested Study Program

First Semester (Year 1)

- ☐ Core graduate courses (6000 level) [6 credits]
- ☐ Elective course (6000 or 8000 level) [3 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Chemistry Principles and Practices (CHEM 6905) [3 credits]
- ☐ Graduate Research (CHEM 8999): Laboratory rotations [1 credit]
- ☐ Selection of a Research Advisor (Deadline: Last day of classes)

Second Semester (Year 1)

- ☐ Core graduate courses (6000 level) [6 credits]
- ☐ Elective course (6000 or 8000 level) [3 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Chemistry Principles and Practices (CHEM 6906) [3 credits]
- ☐ Group Meeting (CHEM 8005, 8205, 8405, 8605, 8801) [2 credits]
- ☐ Introduction to Graduate Research (Starting in January)

First Summer (Year 1)

- ☐ Qualifying Exams (pass a minimum of two)
- ☐ Thesis Committee Selection
- ☐ Start working on Proposal A
- ☐ Graduate Research (CHEM 8999)

Third Semester* (Year 2)

- ☐ Proposal A: Research Work Plan [Deadline 1 (Written component): Last Friday of October; Deadline 2 (Oral Defense): Last day of classes]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Group Meeting [2 credits]

Fourth Semester (Year 2)

- ☐ Elective course (Specialization area; 8000 level) [3 credits]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Group Meeting [2 credits]

Second Summer (Year 2) & beyond*

- ☐ Graduate Research (CHEM 8999) [1-12 credits]
- ☐ Thesis Seminar Presentation (Fulfills the graduate seminar presentation requirement)
- ☐ Thesis Oral Defense

* The registration and attendance to graduate seminars (CHEM 8901-8902) and group meetings each semester is an important requirement during the time the student is registered in the Graduate Program.

* A graduate student, bonafide and full time, should complete all the requirements for the master's degree in three years.

Doctor in Philosophy in Chemistry: Suggested Study Program

First Semester (Year 1)

- ☐ Core graduate courses (6000 level) [9 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Chemistry Principles and Practices (CHEM 6905) [3 credits]
- ☐ Graduate Research (CHEM 8999): Laboratory rotations [1 credit]
- ☐ Selection of a Research Advisor (Deadline: Last day of classes)

Second Semester (Year 1)

- ☐ Core graduate courses (6000 level) [9 credits]
- ☐ Graduate Seminar (CHEM 8901) [1 credit]
- ☐ Chemistry Principles and Practices (CHEM 6906) [3 credits]
- ☐ Group Meeting (CHEM 8005, 8205, 8405, 8605, 8801) [2 credits]
- ☐ Introduction to Graduate Research (Starting in January)

First Summer (Year 1)

- ☐ Qualifying Exams (Must pass three)
- ☐ Thesis Committee Selection
- ☐ Start working on Proposal A
- ☐ Graduate Research (CHEM 8999)

Third Semester* (Year 2)

- ☐ Proposal A: Research Work Plan [Deadline 1 (Written component): Last Friday of October; Deadline 2 (Oral Defense): Last day of classes]
- ☐ Elective course (6000 or 8000 level) [3 credits]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]

Fourth Semester (Year 2)

- ☐ Elective course (Specialization area; 8000 level) [3 credits]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]

Second Summer (Year 2)

- ☐ Graduate Research

Fifth Semester (Year 3)

- ☐ Third year seminar (Fulfills the graduate seminar presentation requirement)
- ☐ Elective course (Specialization area; 8000 level) [3 credits]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]

Sixth Semester (Year 3)

- ☐ Proposal B: Original research proposal. The subject of this proposal may be, but not necessarily, related to the subject of the third year seminar.
- ☐ Elective course (Specialization area; 8000 level) [3 credits]
- ☐ Graduate Research (CHEM 8999) [1-12 credits]

Third Summer (Year 3) & beyond*

- ☐ Graduate Research (CHEM 8999) [1-12 credits]
- ☐ Thesis Seminar Presentation
- ☐ Thesis Oral Defense

* The registration and attendance to graduate seminars (CHEM 8901-8902) and group meetings each semester is an important requirement during the time the student is registered in the Graduate Program.

* A graduate student, bonafide and full time, should complete all the requirements for the doctoral degree in five years.

Form A3- ACADEMIC STATUS SHEET

Name: _____

Student's number: _____

Date: _____

Date of entrance to the Program _____

Classification ☐ MSc; ☐ PhD

Specialization Area: ☐ Analytical; ☐ Biochemistry; ☐ Inorganic; ☐ Organic; ☐ Physical Chemistry

Placement Exam

(Deficiencies): ☐ Analytical; ☐ Inorganic; ☐ Organic; ☐ Physical Chemistry

Qualifying Exams: ☐ Analytical; ☐ Biochemistry; ☐ Inorganic; ☐ Organic; ☐ Physical Chemistry

Teaching Assistantship Requirement: ☐ Yes ☐ No

Committee Members

1. _____

2. _____

3. _____

4. _____

5. _____

☐ Proposal A; Presentation date: _____

☐ Graduate Seminar; Presentation date: _____

☐ Proposal B; Presentation date: _____

☐ Thesis dissertation; Presentation & defense date: _____

Courses Passed:

APPENDIX B

GRADUATE SEMINAR EVALUATION SHEET

CHEM 8901-8902

Name of Student: _____

Title of Seminar: _____

Date of Seminar: _____

Evaluator: _____

Evaluator Signature: _____

SCORE

I- Summary (abstract) (20 points) - - - - - _____/20

Evaluation Criteria:

- 1- Actuality or pertinence of the theme.
- 2- Selection of a subject of general interest and appropriate for a general audience.
- 3- How well does the summary represent the oral presentation?
- 4- Style, orthography, organization, format (complies with ACS format).
- 5- Use of representative references or of greater relevancy.
- 6- Originality in writing and proper credit given to other scientists.

Comments and/or Recommendations:

II- Presentation (60 points)

Evaluation Criteria:

A- Introduction or Background - - - - - _____/20

- 1- Clearly and precisely expressed the problem or subject matter of the seminar?
- 2- The topic was integrated as an adequate perspective?
- 3- Did the student demonstrate sufficient knowledge of the background of the subject?
- 4- Were the objectives of seminar presented clearly?

B- Description of Topic - - - - - _____/20

- 1- The presentation was organized and coherent.
- 2- A clear and logical presentation of the methodology of the experiments and the results.

3- Critical analysis of the results; extensive knowledge of the topic.

4- Clear presentation of the conclusions.

C- Presentation Techniques - - - - - /20

1- Emphasis placed on important points and concepts (vs. monotonic).

2- Clear and organized presentation of diagrams, schemes, figures, tables, graphics (¿Did he or she explain its significance, its relevance to the subject?)

3- Good use of audiovisual resources.

4- ¿How interesting did he or she make presentation to generate the audience's interest?

5- Was eye contact established with the audience?

6- Adequate use of time. (no less than 45 minutes for presentation)

Recommendations:

III- Questions (20 points) - - - - - /20

Evaluation criteria

1- Could the student have contributed and expanded more in the answers than presented in the seminar or abstract? (e.g. others examples, others resources).

2- Did the student demonstrate to have a solid knowledge of the subject?

3- Did the student have confidence when asked questions (appear to be comfortable and secure)?

TOTAL POINTS EARNED - - - - - /100

Recommendations:

Total Evaluation:

100-90 A (Excellent)

89-80 B+ (Very good)

79-70 B (Good)

≤69 (FAILED)

Note for Evaluator: Please consider the following:

Subject level of difficulty: 1 2 3 4 5

Knowledge or experience that the evaluator has on the subject: 1 2 3 4 5

(Low and high score)

The answer to these two questions will be considered as supplementary information for the Seminar Coordinator of (Chemistry

8901-02) not necessary criteria for the final qualification that the student will obtain. Therefore, the answer is optional.

APPENDIX C

PRE-REGISTRATION FIRST SEMESTER 20__–20__

Name _____

Student's number _____

Advisor's Name

Advisor's Signature

Mark with an X the courses that you wish to take during the semester of August to December, 20__.

Course Credits Date Hour Professor Room

Q-6011 Inorganic Chemistry Theory I 3

Q-6215 Analytical Chemistry Theory 3

Q-6411 Organic Chemistry Theory I 3

Q-6612 Advanced Physical Chemistry I 3

Q-6811 Advanced Biochemistry I 3

Q-6896 Master Thesis Continuation 0

Q-6905 Principles and Practices of Chemistry I 3

Section 1 - General and Analytical Chemistry

Section 2 - Organic Chemistry

Section 3 - Physical Chemistry

Q-8005 Inorganic Chemistry Seminar I 2

Q-8205 Analytical Chemistry Seminar I 2

Section 1

Section 2

Section 3

Q-8405 Organic Chemistry Seminar I 2

Section 1

Section 2

Section 3

Section 4

Q-8605 Physical Chemistry Seminar I 2

Section 1

Section 2

Section 3

Section 4

Q-8801 Biochemistry Seminar I 2

Section 1

Section 2

Q-8896 Doctoral Thesis Continuation 0

Q-8901 Graduate Seminar I 1

Section 1

Section 2

Q-8999 Graduate Research 1-12

Section 13

Section 16

Section 19

Other course are offered during the corresponding semester:

PRE-REGISTRATION SECOND SEMESTER 20__-20__

Name _____

Student's number _____

Advisor's Name

Advisor's Signature

Mark with an X the courses that you wish to take during the semester of January to May, 20__.

Course Credits Date Hour Professor room

Q-6012 Inorganic Chemistry Theory II 3

Q-6225 Advanced Instrumental Chemistry 3

Q-6412 Organic Chemistry Theory II 3

Q-6611 Advanced Physical Chemistry II 3

Q-6812 Advanced Biochemistry II 3

Q-6896 Master Thesis Continuation 0

Q-6906 Principles and Practices of Chemistry II 3

Section 1 - General and Analytical Chemistry

Section 2 - Organic Chemistry

Section 3 - Physical Chemistry

Q-8006 Inorganic Chemistry Seminar II 2

Q-8206 Analytical Chemistry Seminar de II 2

Section 1

Section 2

Section 3

Q-8406 Organic Chemistry Seminar II 2

Section 1

Section 2

Section 3

Section 4

Q-8606 Physical Chemistry Seminar II 2

Section 1

Section 2

Section 3

Section 4

Q-8802 Biochemistry Seminar II 2

Section 1

Section 2

Q-8896 Doctoral Thesis Continuation 0

Q-8902 Graduate Seminar II 1

Section 1

Section 2

Q-8999 Graduate Research 1-12

Section 13

Section 16

Section 19

Other courses are offered during the corresponding semester:

Form C1a- GRADUATE RESEARCH-CHEMISTRY 8999

A. AUTHORIZATION FOR REGISTRATION IN RESEARCH COURSE*

Year 20____–20____;

Semester: ☐ 1; ☐ 2

Name _____

Student's number _____

Date of Admission to the Program _____; Classification ☐ MSc; ☐ PhD

Date Starting Research _____ Number of Credits Requested _____

Thesis Title _____

Advisor's Name

Advisor's Signature

Date

B. SAFETY RULES

1. All students should use security glasses at all times in the laboratory. Regular glasses are not acceptable. Neither should contact lenses be used in the laboratory.
2. Students should use closed-toe shoes when working at the laboratory.
3. Students must wear appropriate protective clothing (lab coat) in the laboratory.
(Note: Wearing shorts in the lab is prohibited.)
4. Not less than two people are allowed to work in the laboratory.
5. Students working with toxic, flammable or irritating substances must use the aspirator.
6. Students should notify the supervisor of any accident in the laboratory immediately.

This is to certify that I read and understand the rules of the laboratory described and I agree to obey these rules and others that are specified (for example: on the Chemistry Hygiene Plan of the laboratory) as a condition to continue at the laboratory. I understand that a deliberate violation is a sufficient reason for my removal from the course.

Student Signature

Date

** **Note:** Parts A and B of this form should be filled out by all students during the pre-registration period. The form should be handed in at the Chemistry Graduate Program. At the end of semester, the student will receive a new form to fill out Form C1b, this should be discussed with the advisor, before handing it in to the Chemistry Graduate Program.*

Form C1b- RESEARCH PROGRESS REPORT

(To be completed by the student at the end of the semester in progress).

Progress Report for the period of _____ and _____.

To be completed by the professor at the end of semester in progress.

GRADE: PS ____ PN ____ PB ____ NP ____

Professor's Name

Professor's Signature

Date

Form C2- Application for Qualifying Exams

First Round _____ Second Round _____

The due date to hand in this application is _____.

Name _____

Student's number _____

Select the exams that you will take:

Area	June	July
Organic	_____	_____
Physical Chemistry	_____	_____
Analytical	_____	_____
Biochemistry	_____	_____
Inorganic	_____	_____

Notes:

1. This application should be filled out by all graduate students who wish to take the qualifying exams.
2. Students who have not applied to take the qualifying exam will not be permitted to take them.
3. An absence at a qualifying exam translates to a zero on the exam and will count as one of the two opportunities that the student has to pass each exam.
4. Any petition related to the qualifying exams should be done by writing to the Committee of Academic Affairs through the Coordinator of the Program within two weeks of before the exam.

Student's Signature

Date

Form C3a- CERTIFICATION OF RESEARCH LAB ROTATIONS

Name: _____ Student's number: _____

Date*: _____

I certify that I have contacted the following professors to participate of a rotation in their respective research labs:

Rotation #1: *(First three weeks of September)*

1. Professor's Name: _____

Professor's Signature: _____

Rotation #2: *(First three weeks of October)*

2. Professor's Name: _____

Professor's Signature: _____

Rotation #3: *(First three weeks of November)*

3. Professor's Name: _____

Professor's Signature: _____

Approved by:

Graduate Program Coordinator

Date

FINAL GRADE: PS ____ PN ____ PB ____ NP ____

* Due date to submit this document: **LAST FRIDAY OF AUGUST**

Form C3b- ROTATION REPORT

Name: _____

Student's number: _____

Date*: _____

Rotation: ☐ #1; ☐ #2; ☐ #3

A. Describe your experience in the space below (Continue on the back of this form if necessary.)

B. Comment on the student's performance during his rotation in your research group:

Professor's Name

GRADE: PS ____ PN ____ PB ____ NP ____

Professor's Signature

Date

* Parts A & B are to be completed by the student and the professor, respectively. This form is due at the CGP office the **LAST THURSDAY** of the month of the rotation.

Form C3c- CERTIFICATION OF SELECTION OF RESEARCH ADVISOR

Name: _____ Student's number: _____

Date*: _____

I have decided to do my graduate research with _____
Professor's Name

on the Project entitled _____

_____.

Project description: _____

Student's Signature

Date

Approved by:

Advisor's Signature

Date

Graduate Program Coordinator

Date

* Due date to submit this document: **LAST DAY OF CLASSES** of the first semester.

Form C4- RESIGNATION FROM THE ADVISOR AND/OR RESEARCH AREA

Name _____ Student's number _____

Entrance date to the Chemistry Graduate Program _____

Advisor _____

Project initiation date _____

Number of research credits (total) _____

Resignation effective date _____

Reasons: _____

Student's Signature

Date

Approved by:

Advisor's Signature

Date

President of Graduate Affairs Committee

Date

Graduate Program Coordinator

Date

Form C5- CONSTITUTION OF THE STUDENT COMMITTEE

Name _____

Student's number _____

Application date _____

Degree: Master _____ Doctoral _____

Interest area/specialty in the graduate program: _____

Proposal preliminary subject / thesis / dissertation:

Proposal composition for the student Committee:

_____ Director of proposal/thesis	_____ Signature	_____ Department
_____ Name of committee member	_____ Signature	_____ Department
_____ Name of committee member	_____ Signature	_____ Department
_____ Name of committee member	_____ Signature	_____ Department
_____ Name of committee member	_____ Signature	_____ Department

Student's Signature

Date

Composition approved by:

Graduate Program Coordinator

Date

The signature of the committee members is evidence of their disposition to be included in the student committee.

Form C6- Change of Student Committee Application

Name _____ Student's number _____

Date of Application _____ Degree: Master _____ Doctoral _____

Change requested: _____

Justification: _____

I agree to form part of the Proposal Committee / thesis of this student:*

_____ Director of proposal/thesis	_____ Signature	_____ Department
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_____ Name of committee member	_____ Signature	_____ Department
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_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Student's Signature	_____ Date
------------------------------	---------------

Composition approved by:

_____ President of Graduate Affairs Committee	_____ Date
--	---------------

_____ Graduate Program Coordinator	_____ Date
---------------------------------------	---------------

** The signature of other Committee members is evidence for their disposition to be part of the student Committee. The signature of the Coordinator of the Graduate Program and of the President of the Graduate Affairs Committee is evidence of the approval of the Committee composition.*

Form C7- Application for Student's Defense of the Proposal /Thesis/Dissertation

Name _____ Student's number _____

Date of Application _____ Degree: Master _____ Doctoral _____

Student's Committee members:

We have received a copy of this student's proposal / thesis / dissertation. We request that the defense of this proposal/thesis will be set for:

_____, 20____ in _____ at _____.
Month Date Place Time

Director of proposal/thesis* Signature Department

Name of committee member Signature Department

Name of committee member Signature Department

Name of committee member Signature Department

Name of committee member Signature Department

I certify that this student has met or will meet with all Graduate Program requirements for the defense of the proposal / thesis this semester.

Application approved by:

Graduate Program Coordinator Date

* On the defense of doctoral proposal this space will be completed by the President of the Committee. On the defense of dissertation this space will be completed by Research Advisor.

B. Defense:

Approved _____ Not Approved _____

Commentaries by the Committee for additional changes to the document:*

** The student commits to make the necessary changes. It is the research advisor's responsibility to see to it that the student makes said changes.*

Form C8- Certification of Approval of Proposal/Thesis/Dissertation

Name _____ Student's number _____

Date of Application _____ Degree: Master _____ Doctoral _____

This is a certification of approval of: _____ proposal; _____ thesis; _____ dissertation

Title of proposal/thesis/dissertation:

The members of the student's Committee certify the approval of this document presented by the student in its final version:

_____ Director of proposal/thesis *	_____ Signature	_____ Department
--	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
-----------------------------------	--------------------	---------------------

_____ Name of committee member	_____ Signature	_____ Department
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Mention: _____ Outstanding; _____ Notable; _____ Good

Approved by:

_____ Graduate Program Coordinator	_____ Date
---------------------------------------	---------------

** For the student's doctoral proposal defense this space will be completed by the President of the Committee. On the student's dissertation defense this space will be completed by the Research Advisor.*

Form C9- APPLICATION TO DROP GRADUATE COURSES

Name _____ Student's number _____

Entrance date _____ Degree seeking: _____ M.Sc.; _____ Ph.D.

Type of assistantship: _____ Teaching; _____ Research

Advisor _____

Course name	Code (QUIM XXXX)	Section	Credits
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Instructor _____

Reasons: _____

This semester's complete schedule:

Course name	Code (QUIM XXXX)	Section	Credits	Instructor
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Student's Signature

Date

Advisor's Signature

Date

Program Coordinator's Signature

Date

Form C10- RESIGNATION FROM THE GRADUATE PROGRAM

Name _____ Student's number _____

Entrance date _____ Degree seeking: _____ M.Sc.; _____ Ph.D.

Type of assistantship: _____ Teaching; _____ Research

Advisor _____

Effective date of resignation _____

Reasons: _____

Student's Signature

Date

Advisor's Signature

Date

Program Coordinator's 's Signature

Date

Postal address: _____

Phone: (Home) _____ (Cell) _____ (Work) _____

E-mail: (Home) _____ (Work) _____

Current or future workplace and address: _____

Appendix D

QUESTIONNAIRE FOR GRADUATE STUDENTS TO UPDATE PERSONAL DATA

Name: _____ Student's number: _____

Entrance date: _____ Thesis Defense Date: _____

Degree obtained: _____ M.Sc.; _____ Ph.D. Specialization: _____

Title of Thesis: _____

Home address: _____

Work address: _____

Phone: (Home) _____ (Cell) _____ (Work) _____

E-mail: (Home) _____ (Work) _____

Would you like to belong to the CGP Alumni Association? _____ YES; _____ NO

Comments*: _____

Please mail it to the following address:

COORDINATOR
CHEMISTRY GRADUATE PROGRAM
UNIVERSITY OF PUERTO RICO-RIO PIEDRAS
PO BOX 23346
SAN JUAN, PUERTO RICO 00931-3346

** We welcome your suggestions and constructive criticism to the Program. We encourage you to send us your professional development information (e.g. CV, résumé) to be included in the next Graduate Program bulletin.*

Appendix 7

SUMMARY OF RECRUITMENT PLAN FOR THE DEPARTMENT OF CHEMISTRY

Since its creation in 1941 chemistry has been one of the most productive departments in the College of Natural Sciences. In the last two years more than 120 peer-reviewed publications were published by the professors of this Department. A more impressive number can also be obtained from grants awarded to the Chemistry Faculty. In an effort to continue this path of excellence, we must replace our retired and leaving faculty so we can accomplish our mission. We do not only have needs in our Graduate Program, but our undergraduate program has also teaching needs.

CURRENT STATE

Without going into an historical account, at the beginning of the year 2014, only 24 full-time tenured-track positions are presently occupied, this is from a total of 33 full-time tenured track positions available. A summary of the professors in the Chemistry Department as to their specific areas of expertise is shown below.

Physical chemistry (5)–

Dr. Rafael Arce*

Dr. Zhongfang Chen*

Dr. Edwin Quiñones*

Dr. Carlos Torres

Dr. Brad Weiner*

Organic Chemistry (7)-

Dr. Rosa Betancourt

Dr. Néstor M. Carballeira*

Dr. Ingrid Montes*

Dr. José A. Prieto*

Dr. José Rivera*

Dr. Abimael D. Rodríguez*

Dr. John A. Soderquist*

Analytical Chemistry (6)-

Dr. Carlos Cabrera*

Dr. Liz Díaz

Dr. Ana R. Guadalupe*

Dr. Noel Motta*

Inorganic chemistry (5)-

Jorge Colón*

Dr. Arthur Tinoco*
Dr. Dalice Piñero*
Dr. Lillian Bird
Dr. Francisco Echegaray

Biochemistry (3) –

Dr. Reginald Morales*
Dr. Kai Griebenow*
Dr. Rosa Flores

Of the 24 tenured-track positions, 18 of these positions are occupied by members of the graduate program with only 6 positions left to take care of the undergraduate teaching duties. To make up for these deficiencies in the teaching laboratories a total of 10 full time contracts are normally awarded each year. The Chemistry Department does a lot of teaching (44.5 FTEs are needed) and we hire service contracts to take care of 12.2 FTEs.

By the end of the year 2012 we lost many faculty members and we started an aggressive hiring process. In Physical Chemistry Dr. Luis A. Veguilla and Dr. Y. Ishikawa retired leaving two positions vacant in the teaching of the undergraduate physical chemistry laboratory (Q-4043-44) and in research in theoretical computational chemistry. Moreover, a couple of years earlier Dr. Kevin Riley, a computational chemist, resigned his position at UPR for personal reasons. In the near future we expect another faculty member in the physical chemistry division to retire. To make up for these three deficiencies we were granted two positions to be filled in physical chemistry. After an initial recruitment effort we were able to hire Dr. Pasquale Fulvio, who is working in an interdisciplinary area of research dealing with new materials with applications in energy conversion and storage, and in the synthesis of new heterogeneous catalysts. Therefore, there is still one position that was not filled since no suitable candidates applied at that time.

The importance of hiring in Biochemistry is still more critical, especially regarding the teaching of advanced biochemistry courses in the graduate program (at the 8000 level). In the last three years we lost Dr. Fernando Gonzalez, Dr. Eric Schreiter, and Dr. Zarixia Zavala, faculty who were teaching graduate level courses in biochemistry and had reasonable strong research groups. We were left with only two faculty members (Dr. Kai Griebenow and Dr. Reginald Morales), and only one (Dr. Kai Griebenow) with an active research program since Dr. Reginald Morales is mainly involved in the administration of federal training programs (RISE, MARC, etc.). There is also a big population of chemistry graduate students (15/90) who are interested in pursuing research careers in biochemistry who at present only have a limited choice in our Department. These students normally will have to seek mentors in other departments of the Faculty of Natural Sciences (such as Biology) or in the Biochemistry Department of the Medical

Sciences campus. Moreover, presently, we are also short of faculty members that could effectively teach advanced biochemistry graduate courses at the 8000 level. In order to make up for this deficiency we announced last year two positions in biochemistry to fill up the void in our program. Unfortunately, we did not receive any suitable applications in this first effort.

Research in Biochemistry is very expensive. Fortunately, parallel to the above effort the Molecular Science Building opened its doors and a strong effort was put to obtain expensive instrumentation (new mass spectrometers, a 700 MHz nuclear magnetic spectrometer, etc.) that could favor the hiring of biochemists doing protein structural studies, an emerging and important area of biomedical research. Therefore, we have decided to seek outstanding candidates who employ biochemical and biophysical approaches to the study of biological structures and biochemical interactions in an area that is biomedical relevant. In addition, we are interested in researchers who can develop a structural biology research program that focuses on structure-function relationships of biomedical important macromolecules and/or protein-drug interactions. The area of protein chemistry is of key importance for the local pharmaceutical industry (for example Eli Lilly) due to the recent expansion of the biotechnology industry and the manufacturing of many protein drugs (such as insulin). Having protein biochemists in our campus will certainly enhance our possibility to collaborate with the local pharmaceutical companies. The Molecular Science Building provides the space and facilities to be able to be competitive in the hiring process of two biochemistry researchers. Therefore, based on this novel scenario we decided to further advertise the two new positions in biochemistry so as to be able to take advantage of the facilities already in place that will allow the development of these researchers in protein science.

The hiring in the field of Analytical Chemistry has been taken care with the recent two hires. Like in Biochemistry, Analytical Chemistry is a very popular choice for our graduate students (29/90). Presently, we have two active research laboratories in Analytical Chemistry by Dr. Carlos Cabrera and Dr. Ana Guadalupe. Dr. Osvaldo Rosario, a senior Analytical Chemist, vacated his research laboratory but he is not yet retiring. Dr. Liz Diaz was recently recruited (4 years ago) to attend most of our undergraduate needs. Recently, we are in the process of hiring two new Analytical Chemists, namely Dr. Eduardo Nicolau and Dr. Vilmali Lopez Mejias. Dr. López-Mejías is expected to create new courses related to her research work and to teach other existing courses in the Department related to her area of expertise that could be in analytical chemistry, instrumental analysis laboratory, solid state chemistry, materials science, and polymer-induced heteronucleation. Dr. López-Mejías is expected to develop cutting edge research emphasizing novel polymorphs of pharmaceutical compounds using polymer-induced heteronucleation. This area of research is of extreme importance to the local pharmaceutical industry and we should expect her to develop strong collaboration with the local companies.

On the other hand, Dr. Nicolau is expected to develop cutting edge research in the area of analytical chemistry emphasizing bio-interfaced nanomaterials, catalysis and/or applied nanotechnology. These are emerging areas in analytical chemistry and we expected Dr. Eduardo Nicolau to establish strong ties and support from NASA.

RESEARCH SPACE

Both Dr. Eduardo Nicolau and Dr. López-Mejías have been assigned space in the New Molecular Sciences Building. In addition, with the departure of Dr. Fernando González (a biochemist) his laboratory needed some major renovation and reassignment of research priorities. Guided by the best use of space and research productivity we divided this laboratory into two areas (and a small third area for radioactive disposal which OPASO runs). Half of this laboratory was assigned to Dr. Carlos Cabrera on the basis of student overcrowding needs, innovative projects, and research funds brought by the principal investigator. This part of the laboratory was put into working conditions by Dr. Cabrera and since the students that occupied this space are graduating he has agreed to give this space to Dr. Eduardo Nicolau. The other half of the laboratory remains a biotesting and cell culture facility run by Dr. Kai Griebenow and Dr. Néstor M. Carballeira, who oversee this operation, based on research needs. The biotesting facility is also presently being heavily used by Dr. Arthur Tinoco.

OUR PRESENT PROPOSED HIRING

In an assessment of its research capabilities and innovative research programs the Chemistry Department contemplated as a viable novel area for development first the hiring of a faculty researcher **the study of biological structures and biochemical interactions in an area that is biomedical relevant**. This will give the chosen candidate the capability of interacting in an interdisciplinary way with the present faculty in terms of collaborations and grant support as well as with the local pharmaceutical industry. The chosen candidates should also have the capability of teaching undergraduate and graduate courses in biochemistry.

Appendix 8

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

Resumen del Plan de Cinco Años (2014-2019):

Dominios del aprendizaje estudiantil a evaluar por año académico

Dominios del aprendizaje	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Comunicación efectiva	√	√	√	√	√
Investigación y creación	√	√	√	√	√
Pensamiento crítico	√	√	√	√	√
Responsabilidad social		√	√	√	√
Razonamiento lógico matemático	√	√	√	√	√
Competencia de información		√	√	√	√
Conocimiento, destrezas y aptitudes propias de la disciplina		√	√	√	√
Integración de conocimiento		√	√	√	√
Curiosidad intelectual		√	√	√	√
Capacidad para el estudio independiente		√	√	√	√
Liderazgo		√	√	√	√
Trabajo en equipo		√	√	√	√

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química



Aprendizaje continuo					
Sensibilidad ética y estética		√	√	√	√
Aprecio, cultivo y compromiso con los valores e ideales de la sociedad puertorriqueña					

Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2014-2015	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 QUIM 6611

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2014-2015	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 QUIM 6611
Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2015-2016	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Responsabilidad social		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA
	Competencia de información		QUIM 6905-6906 QUIM 8901-8902

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química



	Conocimiento, destrezas y aptitudes propias de la disciplina		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Integración de conocimiento		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA EXPERIENCIA AYUDANTE DE CÁTEDRA
	Curiosidad intelectual		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Capacidad para el estudio independiente		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Liderazgo		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Trabajo en equipo		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Sensibilidad ética y estética		EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2016-2017	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Responsabilidad social		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA
	Competencia de información		QUIM 6905-6906 QUIM 8901-8902
	Conocimiento, destrezas y aptitudes propias de la disciplina		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Integración de conocimiento		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

	Curiosidad intelectual		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Capacidad para el estudio independiente		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Liderazgo		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Trabajo en equipo		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Sensibilidad ética y estética		EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2017-2018	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Responsabilidad social		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA
	Competencia de información		QUIM 6905-6906 QUIM 8901-8902
	Conocimiento, destrezas y aptitudes propias de la disciplina		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Integración de conocimiento		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

	Curiosidad intelectual		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Capacidad para el estudio independiente		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Liderazgo		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Trabajo en equipo		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Sensibilidad ética y estética		EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

Año Académico	Dominios a evaluar	Objetivos de aprendizaje	Cursos donde se evaluará
2018-2019	Comunicación efectiva		QUIM 6905-6906 QUIM 8901-8902
	Investigación y creación		QUIM 6905-6906 QUIM 8901-8902
	Pensamiento crítico		QUIM 6905-6906 QUIM 8901-8902
	Responsabilidad social		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Razonamiento lógico matemático		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA
	Competencia de información		QUIM 6905-6906 QUIM 8901-8902
	Conocimiento, destrezas y aptitudes propias de la disciplina		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Integración de conocimiento		QUIM 6905-6906 QUIM 8901-8902 EXAMEN CUALIFICATIVO QUÍMICA FÍSICA EXAMEN CUALIFICATIVO INORGANICA EXPERIENCIA AYUDANTE DE CÁTEDRA

Plan de Assessment del Aprendizaje estudiantil de Cinco Años (2014-2019)

Programa Graduado de Química

	Curiosidad intelectual		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Capacidad para el estudio independiente		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Liderazgo		QUIM 6905-6906 QUIM 8901-8902 EXPERIENCIA AYUDANTE DE CÁTEDRA
	Trabajo en equipo		EXPERIENCIA AYUDANTE DE CÁTEDRA
	Sensibilidad ética y estética		EXPERIENCIA AYUDANTE DE CÁTEDRA