

JMR Lab Guidelines for Proposals A & B

(as of 10/4/10)

You should follow these guidelines, which are adapted from the standard NIH grant application instructions (PHS 398).

Content of Research Plan

Organize *Items A-D* of the Research Plan to answer these questions:

- *What do you intend to do?*
- *Why is the work important?*
- *What has already been done?*
- *How are you going to do the work?*

Face page (1 page)

Include the UPR and Departmental information, title of proposal, your name, student number, date of the proposal presentation and names of the committee members.

Table of Contents (1-2 pages)

A. Specific Aims (1 page)

List the ***broad, long-term objectives*** and the goal of the specific research proposed, e.g., to ***test*** a stated ***hypothesis***, ***create*** a ***novel design***, solve a specific problem, ***challenge*** an existing ***paradigm***, ***address*** a ***critical barrier*** to progress in the field, or ***develop new technology***.

B. Background and Significance (4-6 pages)

Briefly sketch the background leading to the present application, ***critically*** evaluate existing knowledge, and specifically ***identify the gaps*** that the project is intended to fill. State concisely the importance and health relevance of the research described in this application by relating the specific aims to the broad, long-term objectives. If the aims of the application are achieved, state how scientific knowledge or clinical practice will be advanced. Describe the effect of these studies on the concepts, methods, technologies, treatments, services or preventative interventions that drive this field. **Two to three pages are recommended.**

C. Preliminary Studies (6-8 pages)

Preliminary Studies. Use this section to provide an account of the principal investigator preliminary studies pertinent to this application. This information will also help to establish the experience and competence of the investigator to pursue the proposed project.

Provide a succinct account of published and unpublished results, indicating progress toward their achievement.

NOTE: *Formatting of tables, graphs, schemes, NMR characterization data, captions, etc. should conform those of the Journal of the American Society style (see Vlado's thesis for examples).*

D. Research Design and Methods (10-14 pages)

Describe the research design **conceptual framework**, **procedures**, and **analyses** to be used to accomplish the specific aims of the project. Unless addressed separately in Section I, include **how the data will be collected, analyzed, and interpreted**. Describe any new methodology and its advantage over existing methodologies. Describe any novel concepts, approaches, tools, or technologies for the proposed studies. Discuss the **potential difficulties** and **limitations** of the proposed procedures and **alternative approaches** to achieve the aims. As part of this section, provide a **tentative sequence or timetable** for the project. Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised.

E. Human Subjects Research (NA)

The following human subject information applies even if you are obtaining specimens from collaborators or if you are subcontracting the human research to another organization.

H. Literature Cited (No page limit)

List all references. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication.

See example at: <http://www.niaid.nih.gov/ncn/grants/app/app.pdf>

The reference should be limited to **relevant and current literature**. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research.

I. Multiple Project Directors/Principal Investigators (PDs/PIs) Leadership Plan (NA)

J. Consortium/Contractual Arrangements (NA)

K. Resource Sharing (NA)

L. Consultants (No page limit)

* Include only if your project involves formal collaborations with other group(s).

Attach appropriate letters here from all individuals confirming their roles in the project and rate/charge for consulting services. **Do not place these letters in the Appendix.**

Appendix (No page limit)

Do not intermingle Appendix materials with the application.

- Include here, if necessary for improved clarity, the detailed experimental procedures like syntheses, detailed procedures for spectroscopic (i.e. NMR, UV/Vis, IR, etc.) experiments.
- You may also want to include specifics about statistical analyses and/or other mathematical procedures that will be used prominently throughout your proposed project.
- Original glossy photographs or color images of gels, micrographs, etc., provided that a photocopy (may be reduced in size) is also included within the 25-page limit of *Items a-d* of the research plan. *No photographs or color images may be included in the Appendix that are not also represented within the Research Plan.*

General guidelines for proposal writing: The Specific Aims section

Brief overview of what the Specific Aims section should be:

- i. First two paragraphs: Must *grab the attention* of the evaluator and state *important knowns* or current state of knowledge of your field, which relate to your proposal. State in a simple and direct way what is the *gap in the knowledge base* you intend to fill. Re-state the gap in knowledge as a problem that prevents your field from moving forward in a particular area.
- ii. You must convince the evaluator that such problem is an important one that deserves to be funded (or a "Pass" grade).
- iii. Paragraph three: Here you state your *long-term* goal or continuum of research your lab is interested in (i.e. what is your expertise). Following you will indicate your *short-term goal* or the general objective of the proposal. This should simply be to fill the gap you delineated in the first paragraph. Then state the *central hypothesis* or *needs statement*; the former must be objectively testable and it should logically flow from the objective of the application. The latter is used when your proposal is more technologically driven, in other words, when you're setting up to build things and determine how they work. Conclude this paragraph with the *rationale*, which is simply why you want to do what you're proposing. This should tell the evaluator what would become possible at the conclusion of the proposed study that is currently not possible to do.
- iv. Paragraph four: State simply and explicitly the **specific aims** (number them). The specific aims should be written as exciting, brief sentences (think of them as headlines in a newspaper). You may include "working hypotheses" for some or all of your aims.
- v. Paragraph five: State the *intellectual merit* of the proposal. Indicate why is your research team *well qualified* to perform the proposed studies. You may include a particular environment, instrumentation unique to your lab or institution, a unique set of collaborators and (very important) any preliminary data on the project that puts you ahead of anyone else in the field.
- vi. Paragraph six: State why the proposed research is *innovative* or what distinguishes your work from the one done by others in your field. Then, describe what should be *expected* from the work once completed. There should be at least one clear outcome as a result of the completion of each aim. So the expected outcome will be to fulfill the general objective described in paragraph three. Conclude this paragraph by stating the *impact* that the proposal should have in your field and what would be possible to do after you have filled "the gap of knowledge" you mentioned in the first two paragraphs. If you're submitting to a funding agency, then it should be directly related to the mission of the agency (biomedically important problem for NIH, advancement of science and education for NSF, etc.)

Guidelines for the Presentation of Proposal A

Purpose

The requirement of proposal A for master and doctoral has several objectives aside from being a requisite for attainment of the degree. One of the objectives is to encourage students to activate his(her) research as early as possible with a well-conceived plan and carefully designed experiments. In the preparation of this proposal it is expected that the student becomes familiar with the chemical literature, particularly that related to his(her) research project and to assess the resources available for the proposed work. The goal of this proposal is that the student engage in an investigation that lead to meaningful and publishable scientific results.

The proposal A should be perceived as a learning, constructive and friendly experience to both the student and the Committee members. It is also an excellent opportunity for professors to become acquainted with the research done by other fellow investigators and for suggesting other experiments and possibilities.

Proposal Body

The proposal A should include at least the following sections: a title page and abstract, a brief introduction, statement of the problem (or need), significance (literature review and background), preliminary results (progress report) and research plans (methodology). Each of these sections has a particular function in the proposal that carefully written and grafted will give the reader a clear picture of your proposed ideas and their relevance to the scientific endeavor. A brief summary of these sections follows with hints on how to spin a successful proposal.

Title page and abstract - The title should be short but self-explanatory. The abstract is usually no longer than 250 words and should be **succinct and motivating**. It states the needs to be addressed, specific objectives to be pursued, activities to meet those objectives, outlines the results and states the project's contribution.

Brief Introduction - the introduction of the proposal **underscores the relevance** of the proposed studies and should **highlight the problems that the investigation is addressing** supported by what it is known presently in the field.

Statement of the problem - the statement of the problem must contain the long-range goal of the research, the particular objectives of your proposal, the central hypothesis, rationale and expectations. A **long-range** goal is the desired end-product of any investigation that is usually not attainable in a single dissertation. The **objective(s)** (specific aim(s)) is(are) what you want to accomplish with your investigation. They should be brief, focused and limited in scope. In addition, they should be written in a logical sequence, one stemming from the other. The proposed investigation must have a **hypothesis** that is testable and can afford, without a predetermined conclusion, an outcome from among various possibilities. The **rationale** is the reason behind the proposed studies and must be related to the problem highlighted in the introduction.

Significance - This section is to **describe what is and what is not known** in the field now. Address the **desired state of the knowledge** and how the **proposed investigation would contribute** to close or shorten the gap between what is known and is not known.

Preliminary results - **describe published results** including most important figures and/or tables and **unpublished results** in more detail.

Research plans - Use separate subsections to develop each planned set of studies and start them by restating the specific aim to address with the proposed studies in each subsection. Within each subdivision restate the hypothesis to be tested and rationale for the study (**What is that you are proposing to do and why?**), describe the methods of approach (**How you plan to do it?**), anticipated findings or results (**What would be the meaning of the results in relation to the project?**) and discuss potential pitfalls or alternative approaches. Detail only unfamiliar methods and refer to previous work for known ones.

Proposal Format

Proposal A should be written using the New Times Roman font and 12 point size. It should be double-spaced with 1" margins at each side of the paper. Total number of pages for the main body of the proposal (introduction to methodology) should not exceed 10 pages including figures and/or tables. Bibliography should not exceed 3 pages.

Hints

- * Be hypothesis driven, not technique-driven.
- * Clearly state the impact of your work in the field.
- * Don't be too ambitious.
- * Always include preliminary data.
- * Write as clearly as possible, avoid complicated words, unusual abbreviations and poor syntax.
- * Be organized, include headings and diagrams.
- * Neatness counts, check misspellings, grammar errors, incorrect references.
- * Experiments should address specific questions.
- * Graphs and tables should be simpler and designed to convey a single idea.
- * Support data should be as close as possible to where it is referenced in the text.