MIBO8610
Proposal Guidelines

The research proposal will constitute a major part of the grade (40 %). Two copies of the first draft (polished) are due at the beginning of class on the date assigned. If the proposal is late, 10 % of the grade will be deducted for every portion of a day it is late (ie., 1 hour late, -10 %; 23 hours late, -10 %; 25 hours late, -20 %; etc.). The proposals will then be graded and returned with comments. You will then have the opportunity to revise the proposal. If you chose not to revise the proposal, your grade for this portion of the course will be determined by your grade on the first draft. Two copies of the revised proposal are due on the date and time assigned. If the proposal is late, 10 % of the grade will be deducted for every portion of a day it is late. If you revise the proposal, your course grade will be based upon the higher grade of the initial and revised drafts minus whatever late penalties you incurred on both drafts.

For the final draft, submit 2 copies. In addition, return the marked up copies of the first draft. If you chose not submit a second draft, just return the marked up copies of the first draft.

Reseach proposal:

Topic: You may choose a topic in any area of microbial diversity as long as it is different from your thesis/dissertation research project. The proposal should have a thesis or hypothesis that is experimentally testable by the chosen experiments. Proposals in which the thesis is of broad interest will be more highly received than proposals that are very narrowly focused. Proposals in which you (the P.I. or Principle Investigator) examine a novel phenomenon will be more highly received than proposals in which you. simply apply what is already known about one organism to another, related organism. The experimental portion of the proposal should be capable of completion within three (3) years by a small laboratory of well-trained investigators. The methodology proposed should be appropriate to the hypothesis tested; and, if new technology must be developed, it must be capable of completion within the time frame of three-years.

Proposal topics should be chosen in consultation with the instructors. On the assigned date, submit a tentative title and one paragraph description of the proposed research. You should not change your proposal topic without consultation with the course instructors.

Proposal Organization: The proposal should follow the general organization of a NSF proposal and should be divided into 5 sections; the length of sections 2-4 must not exceed 15 double-spaced pages of 12 point type.

1. Project Summary. A one page statement of the activity
2. Background and Significance. Briefly sketch the background to the present proposal, critically evaluate existing knowledge, and specifically identify gaps which the

project is intended to fill. State concisely the importance of the proposed research by relating the specific aims to the broad, long term objectives.

3. Specific aims. State the broad, long term objectives and describe concisely and realistically what the specific research is intended to accomplish by 1-3 people in 3 years and the hypothesis to be tested. (about 1 page).
4. Experimental Design and Methods. Outline the experimental design and procedures to be used to accomplish the specific aims of the proposal. Include the means by which the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantages over existing methodologies. Discuss potential difficulties and limitations of the proposed procedures and alternative procedures to achieve the specific aims. Do not provide experimental details which are well-described in the literature such as buffers, pH, medium composition, etc. Provide a tentative timetable for the investigation.
5. Literature cited. Use ASM journal format for citing references. Include the title of the papers. This section may be single spaced.

Proposal evaluation: Proposals will be evaluated according to these three criteria in a balanced fashion:

1. The technical soundness of the proposed approach
2. Intrinsic merit of the research. Likelihood that the proposed research will lead to new discoveries or fundamental advances within its field of science.
3. Utility or relevance of the research. Likelihood that the proposed research will contribute to the achievement of a goal that is extrinsic to the research field itself and thereby serve as the basis for new or improved technology or assist in the solution of societal problems.

Checklist for proposal evaluations:

Technical points:

Length of paper, too short or too long
Grammar / Spelling / Correct format for bibliography

Content:

Project summary, correct content and format
Background and significance
    Complete but concise
    Utility or relevance of proposed research
Clear statement of specific aims & objectives or thesis
Experimental design
    Technical soundness of approach
    Complete description of experimental details
    Alternative approaches
Intrinsic merit of proposal

Proposal rating system. The grade you receive on your proposals will be the average of the two faculty evaluations with excellent (100-96%, A+), very good (95-90%, A), good (89-80%, B), fair (79-70%, C), or poor (<70%, D or F).

Sections of the Proposal: The length of sections 2-4 must not exceed 15 double-spaced pages of 12 point type with one inch margins..

1. Project Summary. Upto one page statement of the proposal.

   The summary of the proposed activty should be suitable for publication independently of the balance of the proposal and not more than one page in length. It should not be an abstract of the proposal but rather a self-contained description of the activty that would result if the proposal were funded. The summary should be written in the third person and included a statement of the objectives and methods to be employed. It must clearly address in separate statements (within the one page summary): 1) the intellectual merit of the proposed activity; and 2) the broader impacts resulting from the proposed activity. It should be informative to other persons working in the same or related areas and, insofar as possible, understandable to a scientifically or technically literate lay reader.

   This should be a concise statement of what you are doing. For many people the summary is the only portion of the document they will read. Your goal is to provide them with an accurate and informative statement of its contents.

   For reviewers, their first opinion is formed from reading the summary. You want it to instill enthusiasm and excitement for the remainder of the proposal.

   Do not create false hopes in the summary.

   Avoid general statements such as: “X will be characterized...” Say how X will be characterized: “Transmission electron microscopy of X will examine morphological features inherent in its association with the gut epithelium”.

   Do not repeat large portions of the summary verbatim in other sections of the proposal!

   Some people write the summary last after the contents of the other sections are completely worked out.

2. Background and Significance. Briefly sketch the background to the present proposal, critically evaluate existing knowledge, and specifically identify gaps which the project is intended to fill. State concisely the importance of the proposed research by relating the specific aims to the broad, long term objectives. In order to stand a chance of being funded the proposal must have goals with broad impacts. NSF emphasizes 'how the potential benefits of the proposed activity benefit society at large'. You need to think big and stretch yourself, but not the truth.

   The amount of background that is appropriate depends greatly on the topic. On one hand, you have to assume that the reviewers are well educated. On the other

hand, you have to assume that they have forgotten most of what they have learned, so you will need to remind them of the critical points.

It is frequently worthwhile to provide a very general (but brief) section appropriate for a very broad audience.

The most important goal of the background is to provide sufficient information so that the significance of the proposed work is clear.

The significance should be clear, forceful, and honest. If the truth isn't good enough, write a different proposal. You want the reviewer to understand why this work is so important. After all, the money could be used to pay for school breakfasts for needy children.

The second most important goal of the background is to introduce the specific aims (next section). How will the experiments you are about to propose solve this important problem?

It is difficult to remember details. Provide details where they are needed. (You can't assume that reviewers will read the proposal in one sitting. Hopefully, they will not be watching TV at the time.)

Write for your audience!

3. Specific aims. State the broad, long term objectives and describe concisely and realistically what the specific research is intended to accomplish by 1-3 people in 3 years and the hypothesis to be tested. (about 1 page maximum).

   Some people like to provide the specific aims as a list, with a simple explanation that follows.

   Keep it short and to the point.

   Remember that the goal is not the method or technique! Rather, a specific aim may be accomplished by using a technique. For example, the specific aim should not be to make a lacZ fusion. The specific aim might be to understand .. (something important) by studying the expression of a gene using a reporter-fusion technique.

   This is usually a separate section so that the reviewers can refer back to it while reading the next section. The reviewers have to decide if your experiments will accomplish the specific aims.

   Write this like the summary: concise, concrete and informative statements. Avoid generalizations.

4. Experimental Design and Methods. Outline the experimental design and procedures to be used to accomplish the specific aims of the proposal. Include the means by which the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantages over existing methodologies.

   Remember your specific aims! If you have a complex design, frequently refer back to your aims so that the reviewer will understand how this all fits together. Sometimes it is worthwhile to organize this section so that the specific aims serves as an outline.

   Discuss potential difficulties and limitations of the proposed procedures. Have alternative procedures to achieve the specific aims. However, don't over do the multiple possibilities. "We could do this and this and this and this..." Stay focused! Don't make an unrealistic laundry list of experiments. Perhaps indicate priorities if multiple approaches are provided.

   Do not provide experimental details which are well-described in the literature such as buffers, pH, medium composition, etc.

   Provide a tentative timetable for the investigation. This is easy and shows that you are well organized.

5. Literature cited. Use ASM journal format for citing references. Include the title and all authors of the papers. This section may be single spaced.

   It is not necessary to cite every paper on the topic, but it is important to have key citations.

   If the format is disorganized, it makes you look bad.

General:

When writing your proposal it is often useful to keep a certain persepctive on what the review criteria are. This was lifted from the NSF review criteria.

What is the intellectual merit of the proposed activity?

Potential considerations: How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, please comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to the necessary resources?

What are the broader impacts of the proposed activity?

Potential considerations: How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geography, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society.

NSF gives a great deal of flexibility in format. The instructions state that as long as the content (sections 2-4) is present, any order of the sections is fine. For the course, you may also use any order with which you are comfortable. For instance, many people put a one-page version of the specific aims as the first page of the proposal. They start with an introductory paragraph and a short list of specific aims. Many people also use the format with the order of sections: 1, 3, 2, 4, 5.

Figures should be integrated into the text and count towards the page limit. Care should be given to the size and total number of figures. Illustrations can be small, but any text in the figures needs to be legible 12 point font. A picture can be worth a thousand words.

Care should also be taken with the appearance of the page. Use enough spaces, line breaks and figures that the page has an "inviting" look to the reviewer. There's (almost) nothing worse than looking at a proposal to review and seeing that every bit of the possible space is filled with text.

Take care to define abbreviations correctly. In general, only use abbreviations when absolutely needed (reviewers have short attention spans) and define them upon first mention. Do not use abbreviations unless the word or phrase appears more three or more times. Use abbreviations that are mnemonics to help the reviewer remember easily the meaning.

Avoid jargon! Many terms we use routinely in our labs would not be readily understood by other scientists. Whenever possible use a general term, followed by a more specific term if needed. For example, don't describe that a novel gene was identified as a "BLAST hit". Rather, use formal language such as "homology searches, using the BLAST program (ref, url or additional info), identified significant sequence similarity to ..."

Be logical. Write an outline and follow it!