GUIDELINES FOR THE GENETICS PROPOSAL EXAMINATION
Revised June 2025

All graduate students who have passed the qualifying examination must submit a dissertation research proposal and defend it orally to advance to candidacy. Unless there is a compelling reason, the proposal is due by the end of the fifth semester (December of the third year). Every attempt should be made to comply with this deadline; it is to your decided advantage to complete this examination and have your advisory committee in place early in the course of your dissertation research. Failure to defend your proposal in a timely way means that you are not in good standing with the program and could jeopardize your enrollment. Any exception to meeting this deadline must be approved by the Program Director.

REQUESTING COMMITTEE APPROVAL

Note that your mentor does not participate in the oral part of the examination (although they must be present at all subsequent committee meetings). However, they can (and should) work in close collaboration with you to prepare the written document.

The Proposal Examination Committee must be composed of at least four faculty and include at least one examiner from outside the Program. Again, your advisor is not part of this Examination Committee and is not counted as one of these four committee members. At minimum, two members of the committee must be part of the Program, with at least one of these from Stony Brook. Your Chairperson must be a member of the Genetics Program. According to Graduate School policy, "no member of the committee may have a family, romantic, business, or otherwise close personal relationship with the student." The Genetics Program extends these restrictions to relationships between committee members and the research advisor. Additionally, The Graduate School requires that at least one member have "no conflict of interest in relationship to the student," including "direct personal, financial, business, professional, or intellectual property relationships."

At least one member of the committee must not be part of the Genetics Program, although he or she does not necessarily have to hold a position outside of any of the three member institutions (SBU, CSHL, and BNL). However, you are strongly encouraged to include someone with whom you have infrequent contact and who can provide a completely different perspective. In addition, remember that the Genetics Program faculty list changes often enough that someone outside the program today may become a member of the Genetics faculty next semester. A committee member from outside of the three institutions is ideal and can enhance your future collaborations and networking efforts. It is not required that the outside member attend the initial proposal in person if doing so imposes too great an expense or inconvenience. Virtual participation of the outside member is acceptable, but the Program Director must be notified of this plan. All other members should attend in person unless an exception is granted by the Program Director.

Summary: Genetics Proposal Exam Committee Criteria[1,2]
Chair (Genetics faculty)
Member (Genetics faculty)
Member who is external to Genetics
Member who is either internal or external

[1]At least one Genetics faculty must be on the SBU campus

[2]At least one member must have no COI with the student

Your Proposal Examination Committee must be approved by the Program Director before invitations are sent to the prospective members. Please get your committee in place well before the date you want to hold the examination to avoid scheduling issues. To obtain approval, send an email with the

names and departments/affiliations of your committee members to the Program Director. Include a CV, NIH Biosketch, or link to a web page for any prospective members who are not faculty at one of the three home institutions.

It is helpful for you to arrange in advance who will serve as the Chair of the committee, so that time is not wasted on the day of the examination in making this decision. It is an advantage to have as Chair someone who is likely to take good notes and file committee reports in a timely way.

PICKING THE TOPIC FOR THE PROPOSAL

Your proposal should be directly related to your dissertation research in the laboratory. The experimental plans should be focused on a specific biological question. Avoid all-encompassing topics as they will be deemed too broad for your individual dissertation. The topic should be chosen only after a detailed discussion with your dissertation advisor. And, as mentioned, your written proposal should be prepared in close consultation with your advisor.

DEVELOPING SPECIFIC AIMS

As a guide, write down a very few specific questions that you want to answer. Don't include questions that are too general. By being specific, the questions will keep your proposal focused on the topic. After you have come up with a few specific questions, outline what experiments you might do to answer them.

An example of a focused specific aim:

- "Is caspase-3 activated during infection by herpes simplex virus type?"

An example of an aim that is too broad:

- "Do viruses induce apoptosis?"

WRITING THE PROPOSAL

Your committee will be expecting you to write your proposal according to the guidelines of an NIH F30 or F31 application (one Specific Aims page and six pages for the proposed work). You must consult with your committee chair if you intend to deviate substantially from the F30/F31 format. It is hoped that the materials you received and the grant-writing skills you learned in BGE 693 will prove helpful.

Relevant preliminary results should be included in the proposal, **but extensive data are not required.** Some suggested guidelines are given below, based on the BGE 693 course. These recommendations assume single-spacing, but you may double-space if you like.

The proposal should include:

- **Cover page**
  - Title: Be specific, accurate, and brief
  - Your name and e-mail address
  - Name of your advisor
  - Date, time, and location of the oral presentation

- **Specific Aims** (no more than 1 page): This section should clearly indicate **what hypothesis you are testing** (a critical element) and the specific questions that you intend to answer. It also should mention (very briefly) the experimental approaches that you will use. Number each separate aim, using subsequent subheadings if appropriate. The typical number of specific aims is 2 or 3. It is usually an excellent idea to end the Specific Aims section with a concise statement of why the work is important and what the results will do to advance the field.

  A specific aim should: a) state the hypothesis to be tested; b) provide a short rationale; and c) briefly describe the experimental approach, as in the example below:

  > This aim tests the hypothesis that caspase 3 is activated during infection by herpes simplex virus type I (HSVI). Since caspase-3 is a critical protease involved in apoptosis, the host cell may respond to viral infection by inducing cell suicide to protect the whole organism. Caspase-3 activation will be assessed after infection of HeLa cells with HSVI by detecting proteolytic cleavage of the precursor enzyme with a western blot and specific antibodies.

  In formulating your aims, make sure to avoid 'fishing expeditions,' where you propose a great deal of work that may or may not yield any useful results. Committees are generally reluctant to let students take on projects that are open-ended and thus 'high-risk'. If you do include such an aim, make sure that it is balanced by other aims that are likely to yield useful data no matter what the outcome. The same concern holds true for aims that will yield purely descriptive data. In most instances, your committee will want to see that, ultimately, your research will give some mechanistic insights into a biological process.

  Also avoid too much interdependence of the experiments. If Aim 3 can only be carried out if Aim 2 is successful, and Aim 2 is dependent on the results of Aim 1, your committee is likely to deem your proposed studies to be too risky.

  Lastly, make sure that undertaking your proposed work is practical, in terms of available reagents, cost, resources, and time needed for completion. Your committee will be concerned about whether the research plan can be completed in two to three years and has a high likelihood of giving you your required first-authored publication.

- **Significance** (~1-2 pages): Briefly present the background literature, but only as it relates to your specific proposal and the questions to be addressed by the proposal. Do not make this a thorough literature search of the field. Critically evaluate the existing knowledge in the area and specifically identify the gaps that your proposal is intended to fill. State concisely the significance of the research that will be carried out in the proposal by relating the specific aims to the gaps in knowledge that will be filled and the questions that will be answered. State briefly the broad relevance of the proposed research to biology or medicine. Diagrams may be included if appropriate. This section is key, since it needs to convince your committee that your project is an important one that will yield results of interest to the research community.

- **Approach** (~4-5 pages)

  - **Preliminary Results**: Use this section to provide an account of your preliminary studies that are pertinent to the proposal. The experiments chosen for inclusion in this section should be directly related to the proposed studies, presented clearly, and described fully. Do not use the Preliminary Results to show how many (irrelevant) experiments you have already carried out. You may include images, graphs, tables, etc. It is also permissible to incorporate your preliminary results into the Experimental Design and Methods sections if doing so improves the flow.

- **Experimental Design and Methods**: For each of the Specific Aims, discuss the rationale for undertaking the study and then describe the experimental approaches that you intend to use. It is not necessary to go into minute detail. For example, you don't need to list the components of a solution that you will be using to lyse cells. However, you may need to indicate that you will be using an isotonic detergent solution. Your goal is to give the reader a clear picture of the methodology that you will use to tackle a problem without burying him or her in small details. If possible, cite references for your methods. If a published method has been used successfully for purposes similar to what you propose, be sure to point that fact out since it supports the feasibility of your approach. Note, however, that the reader should not have to consult your cited references to be able to understand how you plan to proceed. Frequently forgotten but critical are controls; always state the controls that you plan to include.

  At the end of each aim, include a section entitled '**Expected Results and Significance**', where you will demonstrate that you've thought carefully about the possible outcomes of your experiments and how you will interpret those outcomes. And a discussion of the significance of the possible outcomes is essential, since it will tell the reader why it is important to do the proposed work in terms of advancing the field. If it works better, a single section with this title and objective can be included at the end of the entire proposal.

  Likewise, at the end of each aim or the entire proposal, include a section entitled '**Potential Problems and Alternative Approaches**'. You've been at the bench long enough to know that first (and even second or third) attempts often fail; there are very few 'sure-fire' experiments. Your committee will want to know that you've considered which experiments might not work and that you've got some ideas in mind for dealing with possible pitfalls.

- **References** (no length limitation): Citations should be in any standard format of your choice, but titles and all authors should be included. Be selective; you don't need to provide a comprehensive review of the literature. Cite only the most recent or most important papers, and when possible cite review articles to cover multiple points. If you don't use EndNote or a similar program, now is the time to begin. These programs are wonderful ways to organize the papers that you've read and easily cite them in your writing. EndNote can be downloaded from the University's SoftWeb site (http://it.stonybrook.edu/services/softweb) at no cost.

TIME REQUIRED TO PREPARE THE PROPOSAL

The time required to prepare a proposal varies greatly from student to student and on whether you plan to continue working in the lab part-time. About a month of full-time work is probably average. It's also probably safe to say that writing it usually takes longer than you think it will, so don't wait until the last moment. **Note that your written proposal should be distributed to your committee at least one week in advance of your meeting so that the members have time to read it before your oral presentation.**

TIPS ON WRITING THE PROPOSAL

- Use at least ½-inch margins on all sides.
- Number your pages.
- Use Aptos, Arial, Palatino Linotype, or Georgia typeface and a font size of 11 points or larger. (You may use a smaller font for figure legends, but make sure it is still easy for relatively old eyes to read.)
- Minimize the use of non-standard abbreviations, and define all abbreviations when you first use them. (Standard terms such as DNA, PCR, ml, etc., can be used without definition.)

- Remember that your committee members may not be as familiar with the topic as you are. Think hard about what a non-specialist will need to know to understand the rationales and approaches - what is obvious to you may not be obvious to an 'outsider'. And avoid using jargon that is specific to your lab or field.
- Don't hesitate to repeat and/or highlight key concepts.
- Make sure that the proposal flows well and builds logically. Construct good paragraphs that begin with a sentence that introduces the topic and end with a sentence that states the main conclusion.
- Observe the rules of tense for scientific writing. In general, results that have been published are accepted as 'fact' and are discussed in the present tense. Your unpublished results should be discussed in the past tense. The experiments that you propose to do are discussed in the future tense. Observing these conventions consistently helps the reader to distinguish among what others have done, what you have done, and what you plan to do. An exception to the rules may be when you wish to emphasize a point. Examples follow:
    - Published results: In its mammalian host, *Francisella tularensis* replicates primarily within macrophages and dendritic cells (1).
    - Unpublished preliminary data: As shown in Figure 2, the live vaccine strain (LVS) of *F. tularensis* grew to high numbers in primary mouse hepatocytes.
    - Proposed experiment: The highly virulent Schu S4 strain of *F. tularensis* will be incubated with mouse hepatocytes for 2 h, the host cells will be washed and lysed with saponin, and the lysates will be plated on agar to enumerate colony-forming units (CFU).
    - Emphasizing a point: My preliminary results clearly indicate that *F. tularensis* is capable of replicating in non-phagocytic host cells.
- Keep your sentences short and crisp. Any sentence that is more than three lines long definitely should be split into shorter sentences.
- Remember that numerals and units need to be separated by a space (e.g., 5.0 ml, 22 nM, 72 rpm, 2 h, 20 min). Leaving out the space is a very common error that you should get in the habit of avoiding now. Exceptions are temperatures (e.g., 37°C) and percentages (e.g., 22%).
- Avoid use of unnecessary phrases. The terms 'can', 'is able', 'has been shown'. 'has been demonstrated', 'has been reported' and other similar phrases almost always can be eliminated to improve the readability of a sentence without affecting its meaning. For example, compare the following pairs of sentences:
    - "*F. tularensis* is able to cause fatal disease in rabbits." vs. "*F. tularensis* causes fatal disease in rabbits."
    - "It has been shown that deletion of *mglA* reduces the virulence of *F. tularensis*." vs. "Deletion of *mglA* reduces the virulence of *F. tularensis*."

THE DAY OF THE ORAL PRESENTATION

The Chairperson will direct the meeting and typically will ask to meet privately with the other faculty prior to your presentation. You will have prepared a PowerPoint presentation that gives a short overview and then describes each specific aim, including methods, expected results, and alternative approaches. Preliminary results may be included in the overview or within each specific aim. Plan a presentation that, without interruptions, would take no longer than 45 minutes. It is an excellent idea to go through your presentation with a group of your peers prior to the examination, encouraging them to offer feedback and ask tough questions.

The examining faculty will interrupt your presentation with questions. Following your presentation, you will again be asked to leave the room for a short time. The committee will then call you back into the room and provide a summary of their opinions and advice.

FOLLOWING THE PROPOSAL EXAMINATION

The Chairperson of your committee must complete an on-line report form (https://forms.gle/TjWgEq66yb7oJtZ98) within two weeks after the examination. Copies will be sent to you and your mentor and placed in your academic file.

It is your responsibility to follow up with the Chairperson to ensure that the report is filed on time, but let the Program Director know if you are having difficulty. **Unless the form is filed, the process to formally advance you to candidacy will not be initiated.**

LOOKING AHEAD

After you pass your proposal exam, your mentor will join the members of the Examination Committee to form your Research Advisory Committee. Remember that **you must meet with your Advisory Committee at least once a year, and more often if the Committee requires**. **Your advisor needs to attend all of these meetings**. You must prepare a brief written progress report and distribute it to your committee members at least one week in advance of the meeting.

Within two weeks of the meeting, **your Chair must complete an on-line report form** (https://forms.gle/kHf9HwJEUUg5wfVj6). Copies will be sent to you and your mentor and placed in your academic file. It is extremely important that these committee reports are submitted in a timely way. They grow in significance as you progress toward graduation. These reports will contain specific aims and goals required by your committee. Some committee chairpersons are slow to write these reports, so it may be up to you to remind them and/or ask the Program Director to intervene.

Failure to hold a meeting and submit a report at least every twelve months may affect your standing with the Graduate Program in Genetics. **For students in years six and beyond, committee meetings must be held every six months until the dissertation is defended and submitted.**