Updated May 31, 2023
Qualifying exam guidelines:

Purpose of the exam:
The goal of the qualifying exam is to ensure that students have sufficient depth and breadth of relevant scientific knowledge and the ability to integrate that knowledge into a coherent Ph.D. research project. The exam will therefore focus on the following areas:

1. Knowledge in the areas covered by the NGP core curriculum courses that have been completed by date of exam.
2. Knowledge in the area of the proposed dissertation research.
3. Ability to develop, discuss and defend a hypothesis driven research project suitable for a PhD dissertation with a focus on the following core competencies: 1) ability to clearly articulate a hypothesis, 2) ability to clearly articulate how proposed experiments, including appropriate controls, address the hypothesis, 3) depth of knowledge of the technical aspects of the experimental approaches and the principles underlying them, 4) ability to clearly describe the strengths and weaknesses of each approach and to discuss alternate approaches, and 5) ability describe the "big picture" view of the research , with an emphasis on an understanding of the scientific literature in the field and how it will contribute to the field.

Structure of the exam:
The qualifying exam involves interrelated written and oral components. The student will prepare a dissertation proposal that reflects their anticipated doctoral research. The committee will assess the proposal based on its scientific coherence, general feasibility, and how well it is written. The oral portion of the exam will consist of a brief (approximately 10-15 minutes) power point presentation of the key features of the study, followed by questions from committee members on <u>any</u> scientific topic related to the student's NGP core curriculum course work or the dissertation proposal. **We ask the committee members to NOT ask any questions for the first 10 minutes of your talk.**

Although the written portion of the exam is based on the student's anticipated dissertation project, this exam is not intended to focus exclusively on the dissertation proposal or to provide final approval of the proposal as the student's actual dissertation project. That will occur at the student's first dissertation committee meeting.

Specific guidelines:
<u>The written proposal:</u> *The overall goal of the qualifying exam proposal is to describe a series of studies that, if successfully accomplished, would lead to the doctoral degree.* This proposal should be written as if it were the dissertation proposal. The proposal presented to the Dissertation Committee at a later date can be, but does not have to be, identical to the qualifying exam proposal. Accordingly, the Exam Committee is not charged with approving the proposal as a PhD project, as that is the responsibility of the student's future Dissertation

Committee. The intent of the qualifying exam proposal is to ensure that the student can develop a scientifically sound dissertation project and can describe that project using a writing style and organizational structure appropriate for consideration by an extramural funding agency. The reviewers should also comment on issues relating to technical feasibility and potential timeframe insofar as they reflect the student's understanding of what will realistically be involved in executing the research. The proposal will also provide a starting point for the oral portion of the exam.

The proposal should convey *what is actually planned for the dissertation research project*. In the best-case the end product would be suitable for use in an extramural grant application, but it **does not have to reach that level of detail**. The exam proposal should, to as great an extent as possible, reflect the student's own thinking and writing. However, the advisor is ***encouraged*** to work closely with the student in developing the project and may provide general feedback to the student on the scientific content, including the experimental design. The advisor should not, however, provide detailed edits of the proposal at any point.

If the student had previously written a grant to an external funding agency, they may use whatever portion of that grant that they, *and not their advisor*, wrote.

- **Proposal structure:** An important goal of the proposal is to provide the basis of a grant that can be submitted to an external funding agency. Therefore, this proposal follows the general structure for an NIH F31 fellowship proposal. This structure should be followed even if the ultimate goal is to submit to a funding agency other than the NIH. The document must be written in 11 point Arial or 12 point Times Roman font with margins no smaller than 0.5 inches; citations must be listed as "author, date" and the bibliography must be full length citations (Authors, Date, Title, Journal Volume: inclusive pages) and be listed in alphabetical order according to the last name of the first author.
    - Specific aims page: 1 page describing the context, long term goals of the project, hypothesis and/or model to be tested. It is important to include a brief description of how each aim will be approached experimentally. The Aims should be written so that they are understandable not only to experts in the field, but by neuroscientists in general. The Aims page will be submitted to the Tracking Committee for approval based on its appropriateness for a neuroscience PhD project. The tracking committee will recommend that the student continue with preparing the proposal, or will provide feedback suggesting changes that must be made to the specific aims before proceeding. A specific aims page must be approved before proceeding.
    - Approach section: This section should be between 10-12 pages (single spaced) and consist of a Background and Significance section, a Preliminary studies section and an Experimental Design section. The page limits given below are estimates.
        - Background and Significance: approximately 3-4 pages of pertinent background that describes the field, what is known about the topic, and

delineates how the aims of the proposal fit into the field. Preliminary data, to the extent that it exists, can be integrated into this section. The background section should not be a wide-ranging literature review. It should **build an argument** for the project and give the committee members what they need to know to evaluate the project, but not more.

- Preliminary data: 1-3 pages. To the extent that you have preliminary data, it should be presented here. Your preliminary data does not need to be extensive, but should be enough to allow the committee to at least assess the technical feasibility of the proposed experiments.
- Experimental design: approximately 5-6 pages that describe the details of the proposed experiments, rationale, and interpretation of the possible outcomes, including potential pitfalls and problems. This section should describe how the research for each aim could actually be carried out and how the data would be interpreted. Generally, each aim is handled separately, starting with an overview of the experimental design for that aim, and followed with a description of each experiment. The student should strive to put their choices of experiments in context of a bigger picture, for example by emphasizing why one approach was chosen over other possible approaches (i.e. microscopy vs flow cytometry vs. western blot). There should be enough methodological detail to give the committee a clear idea of exactly what the experiments physically entail. It is also critical to discuss exactly how the data will be quantified and analyzed. Plans and rationale for statistical tests and sample size determination should be clear and thorough. The next section should include a discussion of the expected results, potential difficulties and limitations and alternative approaches. **The discussion of limitations and alternative approaches is important and should not just be a few throw-away sentences.** In fact, it is an ideal place for the student to demonstrate their depth of understanding. Finally, a few brief sentences giving a realistic projected timeline should be included.

The oral exam: *The overall goal of the oral portion of the exam is to assess your level of knowledge in areas covered by the NGP core curriculum and the dissertation proposal, and to evaluate your general understanding of the dissertation proposal.*

- The oral exam can be any length less than 3 hours (it is expected that most exams will be 2- 2.5 hours long).
- The oral exam starts with an approximately 10 to 15 minute long presentation by the student. The committee members are asked to not interrupt the student for the first 10 minutes of their presentation. The oral presentation can assume that the listeners have read the proposal thoroughly.
- It is the responsibility of the committee chair to ensure that the exam is conducted in a respectful manner. In the event of conflicts between committee members and the student, it is the chair's responsibility to advocate for the student and ensure that the student is treated fairly.

Evaluation:

- The proposal and the oral exam will be evaluated separately.
- Evaluation of the written exam will include consideration of the following:
    - focus (stating a specific hypothesis, model, or question that will be tested by the proposed experiments)
    - background (concise presentation of the context of the research and a description of previous work in the field together with stating the remaining questions in the field and the relevance of the proposed work to these questions)
    - experimental design (do the proposed experiments actually answer the question or test the hypothesis; are they appropriate for the study; has the student considered the various plausible outcomes and how the results will be interpreted)
    - clarity of writing and logic
    - presentation: grammar, spelling, appropriate use of language

- The oral exam will be evaluated based on:
    - The student's ability to answer questions on any area related to the NGP core curriculum or the dissertation proposal.
    - The ability of the student to articulate and discuss the "big picture" view of the dissertation project, along with its significance to the field.
    - The ability of the student to discuss the scientific and technical aspects of the proposed experiments.
    - An understanding of reasons underlying the choice of experimental approach and its strengths and weaknesses.

- Three possible "grades" can be assigned by majority vote of the examination committee for **each component** (proposal and oral exam). In the event of an unresolvable Pass/Fail tie vote amongst the committee, the grade will default to Fail.
    - Full pass
    - Conditional pass- passes when conditions are fulfilled (eg, re-write of a portion of the proposal or be re-examined by one or all committee members on an area of the oral exam). *This is by far the most common outcome.*
    - Fail- a fail means that either the proposal and/or performance on the oral exam was unacceptable
- In the event of a Fail, you are given one chance to re-take the exam and may do so with a new committee. The choice of whether to use the same or a different committee must be confirmed by you in writing within two weeks of the first exam via a form provided by the NGP. Please work with both your committee and the program director to arrange a timeline for your retake.

- If you fail *either* component a second time, you will be disqualified from pursuing a PhD within the NGP. The exam committee must forward a recommendation to the Director as to whether the you should be immediately dismissed from the program or can be allowed to complete a terminal Master's degree.

The exam committee:
The examination committee will consist of at least three members, all of whom must be members of the NGP. Committee members will be selected by the Tracking Committee based on the recommendation of the student and his or her advisor; **the advisor will not be a member of the committee**. It is advised that the student and advisor request committee members that might also serve on the student's future dissertation committee, but this is not required. The NGP office will contact the committee members to confirm that they agree to serve on the exam committee. The committee chairperson will be chosen by consensus of the committee. The chairperson is responsible for moderating the oral exam, ensuring that the student is treated in a respectful and fair way, and documenting the activities of the committee with respect to the outcome of the exam.

Timeline: Starting September of year 2. An important goal of the timing of this exam is to facilitate the student's ability to submit a grant proposal to an extramural funding agency within their second year in the program. The following timeline will permit students to meet the April 8 (encouraged) or August 8 deadlines for NIH F31 proposals. This gives a range of September through January of year 2 to submit the Specific Aims page to the NGP tracking committee. ***Deadline extensions are strongly discouraged***, however in extenuating circumstances an extension can be requested. Extension requests should be sent by email to the NGP Director and should clearly state the extenuating circumstance prompting the request. The Director will forward the request to the Tracking Committee for approval.

For April 8 NIH F31 deadline (strongly encouraged):

- Mid-September: Submit the Specific Aims page to the NGP tracking committee for evaluation of its suitableness.
- October 1: If the Specific Aims are approved, set a date for the oral exam.
- December 1: Submit proposal to exam committee at least two weeks prior to the oral exam date.
- December 15: Oral exam.
- Re-takes must occur no later than six weeks after the oral exam.
- April 15: After successful completion of the qualifying exam, the dissertation committee will be formed. The student has the option of using the exam proposal verbatim as the dissertation proposal. Guidelines for the formation and charge of the dissertation committee are provided in a separate document.

For August 8 F31 NIH deadline:

- Mid-January: Submit the Specific Aims page to the NGP tracking committee for evaluation of its suitableness.
- February 1: If the Specific Aims are approved, set a date for the oral exam.
- April 1: Submit proposal to exam committee at least two weeks prior to the oral exam date.
- April 15 15: Oral exam.

- Re-takes must occur no later than six weeks after the oral exam.
- August 15: After successful completion of the qualifying exam, the dissertation committee will be formed. The student has the option of using the exam proposal verbatim as the dissertation proposal. Guidelines for the formation and charge of the dissertation committee are provided in a separate document.

Students are strongly encouraged to keep to one of these timelines even if submitting grant proposals to agencies other than the NIH. Exceptions must be approved by the NGP Director and requests must include a revised timeline including proposed new target dates for grant submission.