

Neuroscience PhD Program Qualifying Exam

Description, Rules, and Student Guide

Mar 2016

Purpose

The qualifying exam (QE) is a combination of written research proposal, oral defense of the proposal, and oral exam of general knowledge before a faculty committee. The purpose is to assess the student's knowledge of his or her field and intellectual readiness to undertake thesis research. This includes general background knowledge in neuroscience, critical reasoning, clarity of thinking, and verbal and written presentation skills.

The QE is specifically designed to ensure that (1) within their immediate thesis area, students have in-depth knowledge of the literature; can design effective experiments and interpret the results; can propose research in a written grant format; and can reason scientifically at a high level and defend their ideas orally; (2) within closely related research areas that are complementary to their thesis area, students have a strong knowledge of concepts, methods, and findings from the literature; and (3) within the overall field of Neuroscience, students have a basic graduate-level understanding of important concepts. The QE is **not** meant to be an evaluation of preliminary data for the thesis proposal.

The QE format should enable students to prepare for the exam effectively, and in a reasonable time frame. Most of the exam focuses on research areas within and related to the thesis area. Knowledge breadth across neuroscience will be examined by a set of questions that explore important topics that all Neuroscience students should know.

QE Format

The exam has three parts: Thesis Proposal, Related Research Areas, and Foundational Questions in Neuroscience. 1/3 of oral examination time will be dedicated to each component.

Part 1: Thesis Proposal.

The student will develop a thesis proposal in the form of an NIH-style grant application. It will have: Title, Abstract, Specific Aims, Background & Significance, Innovation, Experimental Plan, and References. Format: 10 pages (excluding References), double spaced, 12-point font, with figures intermixed.

The overall research questions and approach for the Thesis Proposal should be planned in consultation with the thesis adviser. Students are encouraged to consult with knowledgeable faculty for general information, literature suggestions, and advice. However, the specifics of project design and analysis, literature review, interpretation and writing must be solely the work of the student.

The Thesis Proposal is sent to the committee and defended orally during the exam.

Part 2. Related Research Areas.

The student will identify, in consultation with committee members prior to the exam, a list of two research areas that are distinct from, but related or complementary to, the dissertation research topic. These areas will be examined orally. During preparation for the exam, faculty may suggest a few papers to begin the student's reading in these areas. It is the student's responsibility to read intensively in these areas and be prepared to demonstrate substantial knowledge of concepts and methods.

The breadth and choice of each area will be determined by agreement between the student and committee members. As a general guideline, consider the Society for Neuroscience list of “Themes and Topics”, at: <http://www.sfn.org/annual-meeting/neuroscience-2013/abstracts-and-sessions/call-for-abstracts/themes-and-topics>. Themes are denoted by a capital letter (e.g., “Development” or “Cognition and Behavior”). Topics are indicated by a number (e.g., “Auditory System”) and subtopics by a lower-case letter (e.g., “Auditory Circuits”). The scope of each Related Research Area is meant to be similar to a Topic within this scheme. Choose areas that complement or synergize with your thesis research topic.

Part 3. Foundational Questions in Neuroscience.

To test broad knowledge in Neuroscience, students will be asked to answer general knowledge questions from a published list of Foundational Questions in Neuroscience. This list is the same for all students, and is available upon entry to the program. Questions may be updated slightly from year to year in the September prior to the qualifying exam. Many of these questions are covered during normal coursework; others can be addressed by reading graduate-level textbooks and/or review articles. Questions are designed to test basic common knowledge of neuroscience facts and principles, and do not require analysis of the primary literature.

During examination of the Foundational Questions in Neuroscience, committee members will choose questions that explore the student’s breadth of knowledge. *Faculty are free to ask follow-up questions to clarify the student’s knowledge, or to assess knowledge gaps, in answering these questions. However, questions on wholly new topics not on the Foundational Questions list are discouraged, because students have not had a chance to prepare for them. Answers are considered satisfactory if they are at the level of a well-performing student outside their area of specialty.*

The oral exam is scheduled for 3 hours. Parts 1 and 2 will likely be intermixed as topics related to the thesis project are explored. Part 3 should constitute a clearly separate period of the QE, either at the start or the end of the exam. It is the QE chair’s job to make sure the exam is fair and weights these three components equally. The QE committee is expected to ask questions that determine the limits of the student’s knowledge, and his or her readiness to independently undertake thesis research.

[QE Committee composition – revised Graduate Division rules March 2016](#)

The committee should have 4 members. It cannot contain the thesis adviser. 3 members must be members of the Neuroscience PhD Program. The fourth, called the “Academic Senate Representative”, can either be from outside the Neuroscience Program, or can be a Neuroscience Program faculty member who has a 0% appointment in HWNI. See list of 0% appointments at the end of this document. Adjunct faculty are eligible to serve, but not as Chair or Academic Senate Representative.

In addition, at least one member must be in the dissertation research area. At least one member must be from a different area of Neuroscience (Cell/Molecular, Systems, Computational, Cognitive).

Chair	Additional Members		Academic Senate Representative
1	2	3	4
Regular member. Not adjunct.	Regular or Adjunct	Regular or Adjunct	<i>Either non-HWNI faculty or HWNI faculty with 0% appt</i>
These must all be HWNI faculty.			Cannot be adjunct.

At least one member must be in your thesis subject area, and one member must be from a different area of Neuroscience.

Eligibility and Timing

The QE is typically taken in the second semester of the second year of graduate study.

Students must have passed, with a grade of B or better, the required foundational courses in 3 distinct areas of neuroscience: (A) Cellular, Molecular & Developmental Neuroscience; (B) Systems and Computational Neuroscience; and (C) Cognition, Brain and Behavior. See the Foundational Course Requirements for details. In general, these courses must be completed before the date of the exam. However, in some cases, the Head Graduate Adviser may allow the course requirement to be fulfilled in the same semester as the QE. In this case, advancement to candidacy will still require successful completion of all courses with a minimum of a B grade.

Extensions for the QE must be pre-approved by the Head Graduate Adviser, and are not given past the fall semester of the student's third year. Under special circumstances, the QE may be taken prior to the second semester of the student's second year. Approval for taking the exam early is based on prior coursework and research experience, and is at the discretion of the Head Graduate Adviser.

Required Deadlines

- * The QE application form listing committee members and Related Research Areas, plus a brief summary of the thesis proposal, must be submitted by **February 1**.
- * The complete thesis proposal must be sent to the committee by **March 1**.
- * If further revisions are made to the thesis proposal, the revised proposal must be sent to the committee at least 1 week prior to the exam date.
- * The oral exam must be completed by the end of the 2nd semester of the second year, unless an extension was pre-approved.

Results of the Exam

All committee members sign the **Qualifying Examination Report Form**. In addition, the Chair of the QE committee must complete the **Qualifying Exam Chair's Report**, which gives feedback on student performance. This report is made available to Program Staff and the student.

The possible outcomes are "Pass", "Partial Pass", or "Fail". In the case of "Fail", the committee must either recommend that you re-take the entire exam for a second and final time, or that re-examination is not recommended, which results in dismissal from the program. "Partial Pass" means you only have

to re-take a defined portion of the exam, as determined by your committee. The committee may also recommend additional course work or other special training. Any re-examination must take place before the end of the next semester.

QE PREPARATION GUIDE FOR STUDENTS

Preparation Step 1

Pick your thesis research topic and write a **very brief** summary (typically < 2 pages). The summary should have 1) Title. 2) Description of the problem and your general approach. 3) 2-3 specific aims, each with a title and brief description. In consultation with your thesis mentor, choose 2 Related Research Areas.

Select your committee members, and ask each of them if they would be willing to serve on your committee. This usually involves a brief meeting in which you describe your proposal. Ask them for input on your Related Research Areas. You should list a few reviews or key primary papers to begin your reading in each area. Your committee may suggest adding or changing one or more of these areas, and may suggest additional papers to guide your reading. Your Chair must approve your final list of Related Research Areas.

By February 1, submit to the Neuroscience Program Coordinator (1) your QE application form with your list of committee members, and (2) your thesis proposal summary. On the QE application form, list as “subject areas” of the exam: i) the title of your thesis proposal, ii-iv) each of your Related Research Areas that you have chosen and your committee members have agreed to, and v) “General Neuroscience”.

Note: The program may minimally adjust your committee composition, if needed to ensure appropriate expertise and to spread QE responsibility equitably among faculty.

Preparation Step 2

Write a detailed draft of your thesis proposal.

Meet with each committee member to discuss your proposal, and get feedback. Faculty can give you scientific comments and suggestions but can't be involved in writing or revising, or in practicing for your QE. *The student is encouraged to consult frequently with his/her thesis mentor (and other faculty, if appropriate) in planning the thesis research. However, faculty members are not permitted to participate directly in the detailed design or writing of the proposal, or in any practice for the exam.*

By March 1, complete your proposal and send it to your committee, along with the final list of your Related Research Areas. The Chair has 1 week to determine whether the proposal is acceptable as a basis for your examination. (The purpose of the Chair's review is not to identify or correct specific logical flaws, but to establish whether the proposal is sufficient as a basis for examination. If it is unacceptable, the Chair must inform the student, and will direct revision of the proposal to the extent needed for its approval.)

Schedule your QE meeting for a 3-hour time slot. (Schedule at least 8 weeks, preferably 12 weeks, ahead of time.)

Step 3: The Examination

The oral examination must take place before end of Spring Semester, 2nd year.

Provide any revised proposal to the committee at least 1 week prior to the exam. The examination will last 2.5-3 hours. The Chair will determine the order of examination, but each of the 3 components should be equally weighted.

You will use the board in your presentation. Bring markers if needed. You cannot use transparencies, slides, or digital presentation media. You can provide 1-2 hardcopy diagrams or figures if the information would be difficult to convey on a board.

You may only bring a ~ 1 page outline to guide your presentation.

Timetable Summary

Prior to February 1 in second year of study:

- Complete your foundational classes.

- Review the Foundational Questions in Neuroscience, and address any missing general knowledge.

- Select your thesis research topic and write a summary of the thesis proposal.

- Choose your Related Research Areas.

- Select your committee members, and ask them if they will serve on your QE committee.

- Modify your Related Research Areas based on input from your committee, and have your chair approve them.

- Submit your QE Application Form including list of committee members, Thesis Proposal Summary, and list of Related Research Areas.

Prior to March 1:

- Meet with your committee members, and get feedback on your thesis proposal.

- Write the full thesis proposal.

- Schedule your QE meeting. (THIS TAKES TIME! – START EARLY)

- Send your complete thesis proposal and final list of Related Research Areas to your committee.

By end of Spring semester in second year of study:

- Any final revisions in your thesis proposal must be sent to your committee at least 1 week prior to your QE date.

- Read independently in your Related Research Areas.

- Complete the oral examination.

- Bring the QE Report Form to the Neuroscience Graduate Program Office.

HWNI Neuroscience Faculty with 0% Appointments

Feb 2016

Bold are members with 0% appointments. These faculty are eligible to serve as 'Academic Senate Representative' on Qualifying Exam and Dissertation Committees.

Which faculty have 0% appointments is an oddity of whether they were hired into one specific department and later joined HWNI, or were hired jointly into a department and HWNI.

Hillel Adesnik (MCB, Neuro)

Martin Banks (VS)

Helen Bateup (MCB)

Diana Bautista (MCB)

George Bentley (IB)

Sonia Bishop (Psych)

Steve Brohawn (MCB, Neuro)

Silvia Bunge (Psych, Neuro)

Jose Carmena (EECS, Neuro)

Christopher Chang (Chem., MCB)

Mark D'Esposito (Psych, Neuro)

Andrew Dillin (MCB, HHMI)

Yang Dan (MCB, HHMI)

Michael DeWeese (Physics, Neuro)

David Feinberg (Adjunct)

Dan Feldman (MCB, Neuro)

Marla Feller (MCB, Neuro)

Howard Fields (Adjunct)

John Flannery (VS, MCB)

Darlene Francis (PH)

Jack Gallant (Psych)

Gian Garriga (MCB)

Corey Goodman (Adjunct)

Thomas Griffiths (Psych)

Ming Hsu (Business)

Ehud Isacoff (MCB)

Richard Ivry (Psych)

Lucia Jacobs (Psych)

William Jagust (PH, Neuro)

Daniela Kaufer (IB)

Stanley Klein (VS)

Robert Knight (Psych)

Richard Kramer (MCB)

Lance Kriegsfeld (Psych)

Stefan Lammel (MCB)

Dennis Levi (VS)

Chunlei Lui (EECS-Neuro)

Evan Miller (Chem., MCB)

John Ngai (MCB)

Bruno Olshausen (VS, Neuro)

Kaoru Saijo (MCB)

David Schaffer (ChemEng)

Kristin Scott (MCB, Neuro)

Michael Silver (VS, Neuro)

Friedrich Sommer (Adjunct)

Mark Tanouye (ESPM, MCB)

Frederic Theunissen (Psych)

Matthew Walker (Psych)

Jonathan Wallis (Psych, Neuro)

David Whitney (Psych)

Linda Wilbrecht (Psych)

Ke Xu (Chem)

Michael Yartzev (BioE, Neuro)