

M3D Guidelines for the General Examination

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M3D students are expected to complete the General Exam by the end of Spring Quarter of the second year. Guidelines for the General Exam are summarized here, including relevant UW rules and M3D policies.

Dates to note:

Winter quarter of Y2 (or earlier):

Identify Supervisory Committee members, including your Clinical Mentor
Schedule a pre-Exam meeting of the Supervisory Committee or meet with members individually.

No later than the first week of spring quarter:

Set a date for the General Exam
Reserve a private conference room for 4 hours

One week before the exam:

Send your research proposal to faculty on the Supervisory Committee, and remind them of the time and place of the exam. Provide each with a link to the General Exam Guidelines, as the Exam is somewhat different in each department and program.

Exam day:

Provide a snack for everyone to enjoy during the exam.
Check conference room reserved for the exam. (Is it clean? is the whiteboard/blackboard clean? Are there enough chairs? If there is a clock is it working?)
Set up and check A/V for the exam.

Immediately after the exam:

Be sure that the warrant is submitted to the Graduate School.

One week after:

Expect the Chair's report and if you haven't received it, remind the Chair or ask the M3D office to do so on your behalf.

Two weeks after:

Submit your report on what you have learned from the General Exam to the M3D office, the Chair of the committee, and your Research Mentor.

General Examination Info

The UW requires that PhD students pass a General Examination for admission to candidacy. The exam can only take place after a student has acquired the 18 graded units of course credit and 60 credits overall (graded and ungraded), as required by the UW Graduate School and detailed at:

<https://www.grad.washington.edu/policies/doctoral/general-exam.shtml>

M3D General Examination

The goal of the M3D Program General Examination is to establish that a student has reached a level of intellectual independence and technical sophistication sufficient to

proceed with thesis research. To demonstrate proficiency, M3D students must write, present and defend a 6 page (single-spaced) grant-style proposal on the thesis research to at least five members of the Doctoral Supervisory Committee, including the Research Mentor, the Clinical Mentor and the GSR. To ensure fairness and consistency of standards, at least two of those Committee members must have successfully graduated two or more PhD students from their own laboratories.

Doctoral Supervisory Committee

The UW requires that students in PhD programs identify a Doctoral Supervisory Committee, which monitors student progress and submits a formal report to the M3D Program at least once a year. The roles and responsibilities of this committee are detailed at: <https://www.grad.washington.edu/policies/doctoral/committee-roles.shtml>

For M3D students, the Supervisory Committee oversees the General Exam and should be appointed the quarter before the exam. The Supervisory Committee is chaired by the Research Mentor and includes the Clinical Mentor and three or four other faculty working in relevant research areas. One of these faculty members is the “Graduate School Representative” (GSR), whose role is to provide an impartial perspective on expectations and student progress.

Choosing a GSR: The GSR need not be closely acquainted with the research area, but should be able to serve as an impartial advocate for the student’s interests. The GSR must be free from any conflict of interest with the committee chair or the student. The GSR may not have a primary, joint, or affiliate appointment in a stakeholder department or the committee chair (if from a non-stakeholder department), or any recent budgetary, personal, research and/or publication relationships with the student or the committee chair. A GSR with broad experience in graduate training may be especially useful if questions arise about whether progress is appropriate, expectations realistic, etc.

R21-style Research Proposal

The core of the M3D General Exam is a written Research Proposal that describes the significance of the proposed research and how it will be carried out. The student will briefly summarize and then defend the proposal at an oral examination.

The Research Proposal should be written following the guidelines for the scientific section of an NIH R21 proposal. The scientific section of an R21 and an F31 fellowship application are the same, but an F31 application requires considerable additional information about training environment and mentorship which are not part of the General Exam, so following the R21 guidelines is much simpler. With the scientific section in hand, a student is well-positioned to apply for an F31 fellowship.

Examples of successful R21 applications to NIAID (National Institutes of Allergy and Infectious Disease) can be found at:
<https://www.niaid.nih.gov/researchfunding/grant/pages/appsamples.aspx#r21>

Components of the R21 Proposal:

The NIH now requires that research grant applications must explicitly state the “scientific premise” to be investigated. The NIH explains “scientific premise” at:
<https://nexus.od.nih.gov/all/2016/01/28/scientific-premise-in-nih-grant-applications/>

The idea seems to be that a research proposal must recognize previously published results of others, but need not accept those results at face value. A fundable proposal could be designed to test a hypothesis that the published literature claims to have proven/disproven, if it provides a persuasive rationale for questioning the published results.

Narrative: Two or three sentences summarizing importance of the proposed research for human disease.

Abstract: 250 words or less summarizing the significance, aims and research strategy.

Specific Aims: one page. The proposal should include 2 or 3 specific research aims, summarized on this page with clear brief statements of the underlying scientific premise and how it will be addressed.

Research Strategy: six pages

A. Significance to Human Health — 2 pages or less

B. Innovations — 0.5 page or less

C. Preliminary Results and Approach — 4 pages or less

This section should be divided into subsections that address each Specific Aim, reiterating the scientific premise, then providing a succinct description of the methods that will be applied, the anticipated results, and possible problems and workarounds.

D. Timeline for Completion — 0.2 page, with a timeline showing how the proposed research will be completed during Years 2-5 of PhD training. Include time for writing at least one manuscript reporting the research.

References Cited: no page limit

Page layout, format and limits: The NIH has very strict rules about page layout and fonts, and it is advantageous to get used to following them.

Margins: at least 0.5 inch at top, bottom and both sides

Font: Black, and either Arial or New Times Roman, size 11 or larger (the NIH now allows other fonts but most investigators seem to use Arial or New Times Roman)

Line spacing: no more than 6 lines per inch.

Figures: It is very useful to include figures, which may be in color. Figures must be legible without magnification, with labels in font 9 or larger. Be sure to provide a legend for each figure and labels for axes, colors, etc.

Due date: the student must send the proposal to all members of the Supervisory Committee who will attend the exam at least one week prior to the exam itself.

Oral Examination

The student will defend the proposal at an oral examination with the Research Advisor, GSR, and at least two other members of the Supervisory Committee present. To ensure fairness and consistency of standards, at least two of the faculty (other than the Research Advisor) must have successfully graduated two or more PhD students from their own laboratories. The meeting begins by appointing a chair for the examination, who is neither the Research Advisor or GSR. The chair's duty is to keep the exam

moving, be sure that all examiners have a chance to ask questions, and be sure that all relevant paperwork is filled out and filed.

To ensure that the student has developed an appropriate level of independence, the Research Mentor is not allowed to ask questions or speak at the General Examination, except if clarification of specific scientific issues is necessary.

The exam begins with a formal presentation by the student. The first slide should provide a brief biosketch, including the student's name, undergrad school and major, year of entry into M3D, course work, TA assignments completed, fellowship support, and other facts the student deems relevant.

The scientific presentation then summarizes the proposal background, significance and approach. It should consist of no more than 20 slides (20-30 minutes). Members of the committee may interrupt at any time with questions. Questions then continue until the chair calls the exam to an end. The exam may last no longer than 3 hours. The student or committee members may request a break during the exam.

Completion of the Examination

The chair will determine when the exam ends, but it may not continue longer than 3 hours. At the end of the exam, the student leaves the room so that committee members can discuss the student's performance, identify strengths, weaknesses, and any critical deficiencies. This discussion typically lasts 15-20 minutes. The chair then calls the student back into the exam room and summarizes the committee's discussion and the outcome of the exam. There are three possible outcomes: satisfactory, satisfactory providing that a specific condition is satisfied, and unsatisfactory.

Warrant

The Grad School issues a warrant for each general exam, which is to be returned to the Grad School summarizing the committee's report. The UW rules state:

If the General Examination is satisfactory, the supervisory committee members who participate at the examination sign the warrant and return it to the student's graduate program by the last day of the quarter (last day of finals week). If an examination is unsatisfactory, a supervisory committee may recommend that the Dean of the Graduate School permit up to a maximum of two additional reexaminations after a period of additional study. Any members of a supervisory committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School.

In some cases, a committee may identify a specific area in which a student needs to learn more. In those cases, a student may pass with the condition that that deficiency be addressed, by taking a specific course or by critically reading the relevant literature and writing a paper that shows understanding of that literature, of a length specified by the committee (but no longer than 5 pages) to be submitted to the committee by a deadline specified at the exam. This condition should be clearly stated in the Chair's summary.

Chair's Report

The Chair of the General Examination committee will write a report on student performance, circulate it for approval by the other committee members, and send it to the M3D Program office, committee members and the student by a date no later than one week after the exam. The Research Mentor will discuss the report with the student

in person. The student may also discuss the report with other faculty on the Supervisory Committee.

Student's Report

M3D students are asked to reflect on what they have learned from the General Exam to write a report summarizing this and submit it to the M3D office, the Chair of the General Exam and the Research Mentor. This is due within two weeks of the date of the General Exam. The report can be presented in any format the student finds most valuable (sentences, paragraphs, bullet points, illustrations, etc.).

Useful things to be aware of:

Remember, the goal of the general examination is to establish that a student has reached a level of intellectual independence and technical sophistication sufficient to proceed with thesis research.

Questions are usually quite simple in intent. Questions will typically probe depth of background knowledge (What does a reference cited as key background to the proposal actually show?); understanding of techniques (Why is that buffer alkaline? What do you provide to a facility that will do whole exome sequencing for you?); understanding of relevant statistics (What does probability $P = 0.05$ mean? Is it better or worse than probability $P = 0.01$?); and correct choice of experimental approaches (why are you doing real-time PCR rather than running a western blot?).

Questions may also be very basic, to test general knowledge.

Sometimes questions are not clearly phrased. If a question doesn't make sense, ask the faculty member to clarify.

Anything that a student presents on a slide or in the written grant application is fair game for questions. So don't include information you don't understand.