

Faculty Instructions for the Microbe-Host Interactions Qualifying Exam
(for Chair, Mentor and all committee members)

I. Instructions for faculty at the Pre-Qual Meeting

The pre-qual meeting is **not an exam**, and the outcome of the pre-qual has no bearing on the student's official record. The primary goal of the pre-qual meeting is for the committee to review the Specific Aims of the student, to make sure they are adequate to support a full written proposal and an oral examination. The secondary goals of the pre-qual are for the student to meet all the committee members and to get some brief practice in presenting in front of the committee; these will help alleviate anxiety. Further, the student may gain insight into what kinds of questions the committee will be asking during the exam, which is acceptable but not expected.

The main activity of the pre-qual is for the student to give a short presentation on their project, discussing their specific aims. The student does not leave the room at the start. It is up to the committee whether the student leaves at the end (see point 5 below).

At the pre-qual meeting, the responsibilities of the Committee Chair include –

- 1) At the beginning, ask the members of the committee to introduce themselves.
- 2) State out loud that this is not an exam – you are reassuring the student as well as informing the committee. Tell the student that, if a question arises, they should do their best to answer it to help the committee consider the Aims, but not to worry if they don't know answers now.
- 3) Remind the mentor(s) that they are not to speak unless specifically queried by a committee member. If necessary, reinforce this point during the meeting.
- 4) Keep everyone on track for time – the meeting should not last more than 1.5 hours, including time for the committee to deliberate if necessary.
- 5) At the close of the meeting, the student needs clear direction about whether the Aims are acceptable and what is their next step. If the Aims are acceptable, the student should schedule the QE. If the Aims need work, does the student need to submit revised written Aims, and if so, who will approve them and when are they due? If the whole committee needs to approve them, is another pre-qual meeting required? Inform the committee that they need to give the student direction on how to go forward, and ask whether anyone wants to discuss these points with the student out of the room.

After consensus is reached by the committee, let the student know about their next step:

- a. Schedule the QE,
or
 - b. Revise the Aims and submit for evaluation (to whom and by what date),
or
 - c. Revise the Aims and schedule another pre-qual meeting (this is a rare occurrence).
- 6) After the meeting, send the student a brief email reinforcing what you told them, and cc the MHI program manager, Liz Roelofs (liz.roelofs@vanderbilt.edu).

II. Instructions for ALL faculty members of Qualifying Exam committee.

GOALS: The qualifying exam comprises two parts: written proposal and oral exam. The goals of the qualifying exam are to assess the student's ability to formulate a series of hypotheses and Specific Aims, determine the student's familiarity with the scientific literature relevant to their field and evaluate the student's general knowledge base and aptitude for a research career. A student self-evaluation or mentor's evaluation of the student will NOT be a part of the exam process.

WRITTEN PROPOSAL: All members of the QE committee will receive the written document from the student one week prior to the exam. The written document is formatted as an F31 grant proposal, but with the research strategy page length extended to 10 pages. The packet also includes a one-page Specific Aims. Bibliography/associated references are required and are not included in the 10-page limit of the research strategy.

For the purposes of the written proposal, the student is not required to include a vertebrate animals or human subjects separate section. However, if such studies are proposed, the student must provide adequate description of proposed procedures and be able to discuss ethical implications of the proposed research with the committee. The Research Plan should assume a timeline of three to four years for the proposed experiments, which could be realistically accomplished with the available resources. The student is responsible for all scientific aspects of the proposal including background information, approach, experimental design, and methodology. The student may consult anyone (concerning methodologies, format, references, etc) during the writing and editing process. This includes the mentor, who can provide constructive feedback but should not re-write the proposal on behalf of the student.

For all committee members, criteria for evaluating the document include, but are not limited to, the following:

- Is the writeup hypothesis-based, scientifically sound and logical?
- Is there sufficient background provided to motivate the experiments?
- Does the student propose alternative approaches, describe expected outcomes, and discuss what it would mean if those outcomes were not obtained?
- Is it well-organized, clearly written with proper grammar/spelling?

If any committee member finds it inadequate in either content or presentation, inform the QE Chair before the meeting begins. The chair will work with the committee members, and the DGS if necessary, to determine whether the student must rewrite the document and reschedule the exam. At the exam, the written document(s) will be evaluated by the committee after the oral presentation.

FACULTY PREPARATION PRIOR TO EXAM: In addition to reading the proposal to determine whether it is adequate, committee members should prepare several lines of questioning (on both the proposal itself and general background) in advance. A variety of questions should be prepared that probes the depth and breadth of the student's knowledge and scientific rigor. It is preferable to start with simpler questions to relax the student. Some sample areas of questioning are included at the end of this document.

STARTING THE EXAM: The exam begins with the student's presentation. Note that we do NOT have the student exit the room at the start of the exam, in order to remain unbiased and apply uniform

standards. Further, we do not discuss the student's academic record or lab performance with the mentor until after the oral exam is over, and we ask you to refrain from these discussions prior to the exam. The chair should remind the faculty mentor that they are to remain silent during the examination, unless directly asked by a committee member for input.

ORAL EXAM: The entire exam meeting should last less than two hours, including closed discussions after the oral exam. The student's mentor is expected to remain silent during the oral exam unless specifically addressed by the committee. Typically, the student prepares a 25-35 min presentation, including a brief background, key preliminary data and proposed aims. Questions are interspersed during the presentation, which typically follows the flow of the written proposal. Roughly two-thirds of the overall exam time should correspond to a presentation and defense of the written proposal, and during this time, questions from the committee ideally probe the student's ability to pose a scientific question, state a hypothesis, develop reasonable strategies and alternatives to test the hypothesis, and anticipate and interpret possible outcomes. Roughly one-third of the overall exam time (spread throughout the exam) should be used to probe the student's knowledge of microbiology, immunology and microbe-host interactions, as well as knowledge of their field of specialization.

FACULTY PARTICIPATION: All committee members should actively participate in questioning. Committee members should let the student answer one question before asking another, and they should try not to interrupt to clarify another member's question. The committee's focus should be to ascertain whether the student has established a critical knowledge base essential for understanding their research project and has the ability to rationalize approaches, design experiments and interpret results.

EVALUATION: After the student has finished the exam, they and their mentor leave the room. The committee members anonymously cast their initial vote and pass the votes to the chair to start the discussion. The committee confers in the student's absence to assess the oral exam and the written document to discuss the proposed outcome. Committee members then can revise their vote, following the discussion. The chair tallies the votes and gives the final outcome. The outcome is Pass or Fail. In the event of a tie, the outcome is an automatic Fail. A "Fail" should be given if the student does not have a clear understanding of the project, knowledge of the relevant scientific literature or fails to understand the rationales or justifications for the experiments and approaches in sufficient depth. The student is allowed to repeat the examination once, usually within a few months, as determined by the chair, mentor and DGS. A conditional pass is not a possible outcome.

POST-EXAM COMMITTEE DISCUSSION: Following the exam and evaluation, while the student and mentor are absent, the committee discusses the student's performance, work ethic, independence, and departmental citizenship. These evaluations and other concerns will be documented in the Chair's Report, but they do not play a role in determining the outcome – pass/fail – of the qualifying exam. Every member of the committee must sign the Results form. Before leaving, it is customary to congratulate the student if they passed.

The student's first regular committee meeting will be scheduled 6 months after the QE to allow timely assessment of laboratory progress and skills during the first 18 months in lab. It is the student's responsibility to schedule committee meetings, but the Program Manager will remind them.

III. Specific role and responsibilities of the CHAIR at the Qualifying Exam, in addition to the roles above.

WRITTEN PROPOSAL: If the student does not distribute the written proposal one week prior to exam, the chair reserves the right to have the meeting rescheduled. If any of the committee members find the written proposal to be inadequate, the chair may confer with all committee members and the DGS to determine whether the student will rewrite the proposal within three weeks and reschedule the exam. The written proposal will be assessed at the end of the exam as the online evaluation form is filled out.

EXAM MEETING: Before the meeting, the Program Manager (Liz Roelofs) will send the necessary links to the student who is responsible to forward to the Chair. Liz typically reminds the student of this responsibility, but it is good practice – if the chair has not received the links two days prior to the exam – to ask the student for sending the links. There are two links: One for the evaluation form and one for the letter summarizing the meeting proceedings.

At the beginning of the meeting, it is helpful to remind the committee that the student does not leave the room at the beginning. Assure the student it is OK to say, “I do not know” rather than fabricating an answer, or to give a partial answer if they only know partial information. If the committee is indeed assessing the depth and breadth of the student’s knowledge, the student will certainly not know all the answers.

It is the chair’s responsibility to keep everyone on track with questioning. If the student seems flustered or upset, try to ask some gentle questions. If it would help them to explain, encourage them to use the board. You may want to move to a new question if the student appears stumped or does not understand a member’s question rather than getting into a lengthy discussion. Try to get all committee members engaged in the questioning rather than having one or two members dominate. The mentor should not assist (or contradict) the student, and it is the chair’s responsibility to enforce this.

The Chair is responsible for keeping the time. The exam should last less than 2 hours total including closed discussions after the oral exam, with approximately 20-30 minutes devoted to asking general questions. Try to leave 15-20 min for the post-exam discussion after the student and mentor leave the room. At the end of questioning, the chair will conclude the exam and ask the student and mentor to step outside while the committee deliberates.

EVALUATION: Chair will poll each member anonymously (votes on paper) to begin the process of reaching a consensus as to whether the student passes the oral and written exam. If a consensus cannot be reached, the majority outcome will prevail after the formal vote. A tie is an automatic Fail for the MHI QE. The Chair will then fill out the QE Evaluation Form and the Results of the QE Form with the committee and get their signatures. If the student does not pass, it is the Chair’s responsibility to delineate (with input from the committee) what remedial steps are most appropriate for a particular student before attempting the exam again. You may suggest a specific reading list to augment background knowledge relevant to their project or have the student meet with an assigned faculty member for “tutorials” to remedy specific gaps in knowledge or to improve breadth of understanding of fundamental cell and developmental biology topics. Please summarize the student’s performance on the exam and make any specific recommendations for improvement on the Chair’s Report Letter (uploaded through a separate link to Redcap).

POST-EXAM COMMITTEE DISCUSSIONS: Following the QE evaluation, while the student is absent, the Chair will lead a discussion about the student's performance in courses and as a program citizen. Please assess independence, work ethic and citizenship through participation at seminars, journal clubs, and upkeep with RCR and IDP requirements. Although not a factor in the QE evaluation, these assessments will help flag any potential problems or behaviors that may need to be monitored. After these closed-door discussions, you will then invite the student and mentor to return so you can debrief the student.

DEBRIEFING WITH STUDENT: As the student is invited back, the other committee members may depart if they choose to; the Chair stays with the student to inform them of the outcome and go over the committee's evaluation. The mentor may be present at the discussion at the Chair's discretion. In the case of a "Pass", make sure to emphasize strengths as well as weaknesses. In the case of a "Fail", make sure to emphasize that the student has the opportunity to turn things around. These discussions can be very important to the student, who has usually worked hard to prepare for the exam and can be anxious about the results. It is helpful to be specific when discussing strengths and weaknesses. The evaluation forms and letter are immediately available to the student, as soon as they are uploaded by the Chair to Redcap.

FORMS: Before the exam ends, the **Results of Qualifying Exam SACS form** (see attached examples) needs to be filled out. The **form** should be filled out in discussion with the committee members while the student is out of the room. The chair will discuss these criteria for evaluation with the student during the post-meeting discussion

Committee Report: The Chair is responsible for composing a report in the form of a letter that documents the committee's evaluation of the exam and outlines comments and suggestions by all committee members. It is customary to send the report to the other committee members for comments or edits before sending to the student to ensure that everyone's input is incorporated. The letter is then uploaded via the student-provided Redcap link. An automated notice of upload and meeting completion is then sent to the MHI program manager to ensure that all students are on track with completion of their QE. Please upload this letter **within one week** of the exam. It is easiest to write the report the same day as the QE.

If you have any confidential concerns pertaining to the student's behavior, mentor-student interactions, or committee member interactions, please either compose a Confidential Chair's report and send to the DGS, or simply schedule a time to talk to the DGS.

CHAIR RESPONSIBILITIES IF MEETING IS HELD REMOTELY: If the exam is held remotely via Zoom, the student generates and shares a link with the committee. There are additional responsibilities of the chair:

- The chair should advise the student to log on 15 minutes prior to the exam so that the chair and the student can share host and ensure that the share screen and audio works properly. It is important for the Chair to have co-host, so that they can enable the waiting room option.
- At the start of the meeting, establish how questions will be asked. Because it is difficult to identify pauses on zoom, one style that works well is for committee members to interrupt at any time with the single word "Question." The student can then finish speaking their thought and acknowledge the questioner.

- After questioning is concluded, the Chair - as co-host - can place the student and the mentor in waiting rooms so the committee can deliberate. Let the student know that deliberations often last 10-15 minutes.
 - After the deliberations, the student and mentor are readmitted from the waiting room and the other committee members depart. The chair discusses the outcome of the exam with the student. To discuss SACS scoring as one component of the discussion, it is useful for the Chair to share your screen.
 - If the outcome is unfavorable, the chair and the committee should take a minute during the deliberations to plan for student support during and after the debriefing with the student. The advisor may want to join in the debriefing session.
 - Forms that require signatures will be distributed by the Program Manager, via DocuSign.
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IV. Specific role and responsibilities of the MENTOR at a Qualifying Exam

The student's mentor is expected to remain silent during the oral exam unless specifically addressed by the committee. This rule was established by the MHI Graduate Education Committee to avoid potential intimidation when the Chair is a junior faculty, and the faculty mentor is in a leadership role.
