

**MOLECULAR, CELLULAR AND  
DEVELOPMENTAL BIOLOGY**

**YEARS 2-4 PROJECT**

**Submitted by:**

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An evaluation of MCDB's graduate program was carried out by the Department's Graduate Affairs Committee (GAC), which consists of six faculty members (Craig Crews, Xing-Wang Deng, Christine Jacobs-Wagner, Haig Keshishian, Frank Slack and Shirleen Roeder) and two graduate students (Richard Reznick and Beth Regulski), and is chaired by the Director of Graduate Studies (Shirleen Roeder). The Committee had four separate meetings with current graduate students, one with 2nd-year students, one with 3rd- and 4th-year students, one with 5th-year students and one with students in the 6th year and beyond. In addition, the Committee alone met on three different occasions. Furthermore, a significant fraction of two meetings of the full Departmental Faculty was devoted to matters pertaining to the Years 2-4 Project.

As a result of our deliberations, we are making several significant changes to our graduate program. These are outlined briefly below, though some are still "work in progress".

## **EVALUATION FORMS**

The single most important message that the GAC received at its meetings with graduate students (in all years) is the need for feedback. Most students did not feel that they have a good sense of how their performance is perceived by the Thesis Advisory Committee and (to a lesser extent) by the Thesis Advisor. For several years, the form that we have provided for annual Committee meetings simply required each Committee member to check "Satisfactory" or "Unsatisfactory" and provide a signature.

To address the need for feedback, we have developed two forms: (i) the MCDB Student Qualifying Exam Progress Report (Appendix 1), and (ii) the MCDB Student Committee Meeting Progress Report (Appendix 2). The former is to be completed at the time of the Qualifying Exam in the student's 2nd year of study. The latter is to be completed each time a Committee meeting is held subsequent to the Qualifying Exam. Per the instructions to the Committee Chair that accompany each Report, the following events should occur. At the end of the Committee meeting, the student should be asked to leave the room while the committee discusses the student's progress, strengths and weaknesses. In consultation with the other committee members, the Committee Chair should complete the Report form. The student should then be asked to return to the room, informed of the committee's conclusions and recommendations, and provided with an opportunity to ask questions. After the meeting, the completed Progress Report should be delivered to Anne Scott (KBT 708), who will send copies of the Report to the student, all of the Committee members, and the DGS.

The forms found in the Appendices have been in use since the middle of March. Since that time, the DGS has received considerable feedback from both Faculty and students, commenting on the usefulness of these forms. The students appear to be genuinely grateful that they are being provided with the feedback they requested, and the Faculty have found that these forms prompt a frank discussion of a student's strengths and weaknesses and inspire students to strive for improvement.

## **CONTINUOUS REPORTING**

MCDB graduate students are expected to meet with their Thesis Advisory Committees at least once per year. Prior to the meeting, the student submits a 2- to 3-page report summarizing progress made over the last year. However, in the absence of reports from previous years, it is not always obvious to (forgetful) Committee members whether the student is making steady progress from year to year. To address this problem, we will institute a system of "continuous reporting", such that the Annual Report will be attached to Reports from previous years. So, for instance, when a student qualifying this year reaches year 5, the annual report will consist of the 5th-year report, stapled to the 4th-year report,

stapled to the 3rd-year report, stapled to the Prospectus proposal. Each year, the student will provide a numbered list of aims for the upcoming year and describe progress made on the individual aims stated in the previous report. The continuous report should make it transparent, both to the student and to Committee members, whether or not significant progress is being made from year to year.

## **CHANGES IN THE FORMAT OF THE QUALIFYING EXAM**

For many years, the format of the Qualifying Exam in MCDB has been as follows. The student meets with the Thesis Advisory Committee, usually about three months before the Qualifying Exam, for a Pre-Prospectus meeting. At this meeting, the student outlines his/her plan for dissertation research, and the Committee may make suggestions for improvement. In addition, the Committee identifies four to five broad topic areas, relevant to the proposed research, in which the student is expected to be knowledgeable by the time of the Qualifying Exam. The student submits a detailed proposal outlining the proposed research at least one week in advance of the Qualifying Exam. The Exam, which is an oral exam, occurs in two phases; the first phase deals directly with the proposal, and the second deals with the assigned reading topics. The Thesis Advisor is present at the Qualifying Exam, but he/she is expected to be an observer rather than an active participant. When this system was first implemented, Qualifying Exams typically lasted three hours, and time was divided fairly equally between the two phases of the Exam. However, over time, the system has devolved into one in which the exam is shorter (1.5 to 2 hours in length), and very little time is spent on the assigned reading topics. Faculty members believe that these changes have resulted in the Exam being less rigorous than it was previously. We have agreed to make three changes in an effort to improve the rigor and efficacy of the Qualifying Exam.

One change affects the Pre-Prospectus meeting. At this meeting, for each of the assigned reading topics, one Committee member will be designated to help the student generate a suitable list of readings. Each topic will be assigned to the Committee member most knowledgeable in that area. These reading lists will be distributed to all Committee members in advance of the Qualifying Exam. In this way, the Committee can be confident that the student is spending his/her time on the most pertinent and important papers in the field. In addition, members of the Committee can come to the Qualifying Exam with realistic expectations as to what the student should know. If the student is not knowledgeable regarding the assigned readings and/or not able to discuss them in a broad context, then this will reflect a failing on the student's part, rather than being attributable to the student simply being misdirected with respect to the choice of readings. Thus, the Committee should be more confident in reaching a decision regarding the student's competency.

A second change involves the order of events in the Qualifying Exam. The two phases of the Exam will be reversed such that questioning of the assigned readings precedes discussion of the proposal. This phase of the Exam should take a minimum of one hour. It is hoped that this change will address the problem that has arisen with the Committee focusing almost exclusively on the proposal, at the expense of questioning regarding the assigned reading topics.

A final change is that the Thesis Advisor will be absent from the deliberative phase at the end of the Exam. Under the current system, the student leaves the room at the end of the Exam, and the Committee (including the Thesis Advisor) discusses the student's performance and makes a decision to Pass or Fail the student or to require successful completion of additional work (e.g., writing a paper on a specific subject, rewriting part of all of the proposal, etc.) before a Pass can be granted. There is concern that, in some cases, the Committee is reluctant to fail a student or require extra work if the Thesis Advisor strongly supports the student. This is of particular concern where the Advisor is a

senior faculty member and some of the Committee members are junior faculty. We will therefore change our practice such that both the student and the Thesis Advisor will be absent from the room while the Committee carries out its deliberations. It is hoped that this will allow Committee members to express their views freely and openly. In some cases, this may result in students being failed who would otherwise be allowed to continue, despite their obvious shortcomings. We believe that it is more appropriate to dismiss a student at the time of the Qualifying Exam, rather than do so a year (or several years) later. We also believe that it is more appropriate to fail a student than to allow an undeserving student to be granted a Ph.D.

### **PLACING STUDENTS "ON NOTICE"**

Some Departments make a practice of discussing all the students in their Program at a meeting of the full Faculty once a year. Such a practice is untenable in our Department, due to the large number of students. However, we do need a mechanism of bringing troublesome students to the attention of the Faculty so that assistance can be provided where needed, or a student can be dismissed from the Program where appropriate. We therefore propose to implement a probationary system in which a student who is not doing well would, at the time of a Committee meeting, be officially placed On Notice that he/she is not performing satisfactorily (details to be provided by the Committee). Once a student is placed On Notice, he/she would be required to have another Committee meeting in six months or less. If performance is still deemed unsatisfactory such that the student continues On Notice, then the matter will be brought to the full Faculty for discussion.

### **WELCOME AND ORIENTATION FOR NEW STUDENTS**

Almost all students joining the MCDB Department do so via the Molecular Cell Biology, Genetics and Development Track of the Biological and Biomedical Sciences Program. Thus, students do not officially join the Department until after their first year. We propose to have a welcome/orientation session with these students early in the fall semester of their second year. The DGS and some or all members of the GAC will be present. We will provide an overview of MCDB requirements and a recommended timetable for achieving various goals. We will offer advice on how to select a Thesis Advisory Committee and discuss the format of the Pre-Prospectus meeting, the Qualifying Exam, and the Prospectus proposal. We will distribute examples of Pre-Prospectus and Prospectus proposals and give out hard copies of the Graduate Student Handbook, which will provide detailed information regarding all phases of study. Students will have the opportunity to ask questions.

### **ANNUAL DGS/GAC MEETINGS WITH ADVANCED STUDENTS**

Once a year, the DGS and some or all members of the GAC will meet with interested students to provide information about thesis preparation and graduation. We will discuss with the students what it takes to graduate, not just in terms of publications, but also in terms of scientific maturity and intellectual independence. We will discuss different formats for organizing data into a thesis. We will present the Department's rules and regulations re thesis submission and readers' reports, as well as the Graduate School's rules and regulations. We will make students aware that the theses of former MCDB graduate students can be found in the Kline Science Library. Students will have the opportunity to ask questions.

## **HANDOUTS FOR FACULTY**

We will prepare instructions for Faculty members, outlining their responsibilities to graduate students. Each time a Faculty member accepts a new student into his/her lab, that Faculty member will be sent a memo outlining his responsibilities, both financial and otherwise, to the student. The memo will list deadlines/timeframes for the Pre-Prospectus, Qualifying Exam and Committee meetings, describe the format and function of these meetings, and outline the responsibilities of the Advisor in helping the student prepare for meetings. This information will be particularly important for new Faculty members and for Faculty who do not hold primary appointments in MCDB. Even long-time Faculty will require a "refresher course" in light of the many changes that we have recently made in our program.

We will also prepare instruction sheets for the Chairs of Qualifying Exams and Thesis Advisory Committee meetings. These will be distributed to the Chair at the time of the Pre-Prospectus when the Committee Chair is selected. Instruction sheets accompany the evaluation forms found in the Appendices, but these need to be updated to accommodate changes made subsequent to the development of the evaluation forms used this semester. (These changes include (i) assignment of Committee members to help with reading lists prior to the Qualifying Exam, (ii) absence of the Thesis Advisor from the deliberative phase of the Qualifying Exam, (iii) "inversion" of the Qualifying Exam such that the questioning re assigned reading topics precedes discussion of the proposal, and (iv) a mechanism for placing students On Notice.)

## **DEADLINES AND REMINDERS**

We have established firm deadlines for the Qualifying Exam and annual Committee meetings. The Qualifying Exam must be held by the end of the 4th semester of study. For students who have already qualified, annual Committee meetings must be held before the following dates: March 1st, for students in year 6 and beyond; April 1st, for students in year 5; May 1st, for students in year 4; and June 1st, for students in year 3. (These dates are staggered so that faculty will not have an inordinate number of meetings in one month.) Failure to hold a Committee meeting prior to the dates listed above requires prior approval of the DGS.

Students will be sent E-mail reminders of these deadlines late in the fall semester. The Registrar's office will keep track of meetings and file progress reports and evaluation forms. In the case of a student who does not have a meeting at the required time, the DGS will contact the student as well as the Thesis Advisor.

## **GRADUATE STUDENT HANDBOOK**

We are in the process of updating and expanding the MCDB Graduate Student Handbook. This Handbook has not been updated since 2001. Many changes have taken place since then, including our joining the Molecular and Cell Biology, Genetics and Development Track of the Biological and Biomedical Sciences Program. The Handbook is being updated to reflect this change as well as the many changes outlined above. In addition, in our meetings with graduate students, we learned that students desire a far more detailed Handbook than we (and most other Departments) provide. The Handbook is being expanded to address the many questions the students posed and concerns they expressed. The revised Handbook will go online this summer, and hard copies will be distributed to entering students at the beginning of the fall semester.

**APPENDIX 1:**

**EVALUATION FORM COMPLETED AT THE END OF  
MCDB STUDENT'S QUALIFYING EXAM**

## MCDB STUDENT QUALIFYING EXAM

### Instructions to Committee Chair

The committee may choose to begin with a brief "executive session", during which the student is asked to leave the room so that committee members may consult privately with the thesis advisor regarding the student's strengths and weaknesses, and make note of any particular problems that need to be addressed.

The student will start by giving a brief presentation, summarizing pertinent background information and outlining the proposed research. This presentation should be planned to take 15-20 minutes, though it may take longer if the committee interrupts with questions.

The Qualifying Exam should take approximately 2.5 hours. It is the policy of the Department that half of the time should be spent asking the student questions directly related to the proposal and the other half of the exam should be spent asking the student questions about the reading topics assigned at the time of the Pre-Prospectus meeting. It is the responsibility of the Committee Chair to ensure that the Committee does not spend too much time on the proposal; approximately one hour must be set aside to test the student's knowledge of the relevant literature. The Chair should also ensure that the student is asked multiple questions in each of the assigned topic areas. In addition, the Chair should make sure that the meeting proceeds smoothly and efficiently, without spending an undue amount of time on any particular question or topic.

The thesis advisor is not expected to be an active participant in the Prospectus Exam. Questions should come primarily from other committee members and should be answered by the student, not by the thesis advisor. However, the advisor may answer particular questions, or participate in a particular aspect of the discussion, if requested by another committee member.

Following the student's presentation and the question period, the student should be asked to leave the room while the committee discusses the student's performance, strengths and weaknesses.

In consultation with the other committee members, the Committee Chair should complete the attached form. Please be honest in your assessment. It is important that the student (and the DGS) be made aware of any problems that need to be addressed.

The student should then be asked to return to the room, informed of the committee's conclusions and recommendations, and provided with an opportunity to ask questions.

After the meeting, the Committee Report should be delivered to Anne Scott (KBT 708), who will send copies of the Report to the student, all of the Committee members, and the DGS.

If the Chair prefers, he/she may write a letter (or E-mail message) to the student addressing the points indicated on the attached form. In this case, the letter/message should be cc'ed to the student, the other members of the Committee, the Registrar (Anne Scott) and the DGS (Shirleen Roeder).

## MCDB STUDENT QUALIFYING EXAM COMMITTEE REPORT

Name of student: \_\_\_\_\_ Date of meeting: \_\_\_\_\_

Name of thesis advisor: \_\_\_\_\_

Committee members in attendance: \_\_\_\_\_

**Please assess the abilities/performance of the student in each of the areas listed below by circling the appropriate descriptor.**

1. Presentation style and clarity of written proposal:

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

2. Quality and clarity of oral presentation:

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

3. Scientific merit of proposed research, importance of problem, novelty, probability of success:

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

4. Thinking deeply/critically about research project, seeing the "big picture":

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

5. Understanding of relevant techniques/approaches; underlying mechanisms, strengths and limitations:

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

6. Anticipating potential technical problems and other reasons why the project might not work:

unacceptable    fair    good    very good    excellent

If an area of concern to the committee, please comment briefly below:

7. Knowledge of the scientific literature in the topic areas (please fill in blanks) assigned at the pre-prospectus meeting:

Topic 1: \_\_\_\_\_

unacceptable      fair      good      very good      excellent

Topic 2: \_\_\_\_\_

unacceptable      fair      good      very good      excellent

Topic 3: \_\_\_\_\_

unacceptable      fair      good      very good      excellent

Topic 4: \_\_\_\_\_

unacceptable      fair      good      very good      excellent

Topic 5: \_\_\_\_\_

unacceptable      fair      good      very good      excellent

If an area of concern to the committee, please comment briefly below:

**Provide additional comments (e.g., areas where student should aim for improvement), if desired.**

**Committee Recommendation (please check):**

\_\_\_\_\_ Pass

\_\_\_\_\_ Fail

\_\_\_\_\_ Decision pending one or more of the following:

\_\_\_\_\_ Student rewriting proposal

\_\_\_\_\_ Student retaking oral exam

\_\_\_\_\_ Student writing paper(s) on specified topic(s) (please specify)

\_\_\_\_\_ Student reading literature on specific topic(s), then meeting with individual committee member(s) (please specify topics and committee members)

\_\_\_\_\_ Other (please specify)

Please specify time frame for completion of any additional work.

**Name of Committee Chair** \_\_\_\_\_

**Signature of Committee Chair** \_\_\_\_\_

**APPENDIX 2:**

**EVALUATION FORM COMPLETED AT THE END OF  
MCDB STUDENT'S COMMITTEE MEETING**

## MCDB GRADUATE STUDENT COMMITTEE MEETINGS

### **Instructions to Committee Chair**

Following the student's presentation and the question period, the student should be asked to leave the room while the committee discusses the student's progress, strengths and weaknesses.

In consultation with the other committee members, the Committee Chair should complete the attached form. Please be honest in your assessment. It is important that the student (and the DGS) be made aware of any problems that need to be addressed, both with respect to the student's performance and the success/promise of the current research project.

The student should then be asked to return to the room, informed of the committee's conclusions and recommendations, and provided with an opportunity to ask questions.

After the meeting, the Committee Report should be delivered to Anne Scott (KBT 708), who will send copies of the Report to the student, all of the Committee members, and the DGS.

If the Chair prefers, he/she may write a letter (or E-mail message) to the student addressing the points indicated on the attached form. In this case, the letter/message should be cc'ed to the student, the other members of the Committee, the Registrar (Anne Scott) and the DGS (Shirleen Roeder).

## MCDB STUDENT COMMITTEE MEETING PROGRESS REPORT

Name of student: \_\_\_\_\_ Date of meeting: \_\_\_\_\_

Name of thesis advisor: \_\_\_\_\_

Committee members in attendance: \_\_\_\_\_

**Please assess the abilities/accomplishments of the student in each of the areas listed below by circling the appropriate descriptor and providing comments where appropriate.**

1. Progress made since the last committee meeting:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
2. Knowledge of the scientific literature relevant to the research project:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
3. Thinking deeply/critically about research project, seeing the "big picture":  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
4. Demonstrating initiative and independence in experimental design and project directions:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
5. Motivation and work ethic:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
6. Technical competence at the bench, trouble-shooting ability:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:
7. Quality and clarity of written and oral presentations:  
acceptable          well above average          an issue of concern to the committee  
If an issue of concern to the committee, please explain briefly below:

**Answer the questions below by circling the appropriate answer.**

8. When can the student be expected to graduate?  
4.5 yrs    5.0 yrs    5.5 yrs    6.0 yrs    6.5 yrs    7.0 yrs    7.5 yrs    too soon to say
9. Does the student have a "story", or at least the beginnings of a story, that will lead to one or more publications?  
yes    probably    maybe    no    too soon to say
10. Should the student consider switching to a different project?  
yes    probably    maybe    no    too soon to say
11. When should the next committee meeting be held?  
3 months    6 months    9 months    12 months

**Please indicate the committee's expectations and requirements, making reference (where appropriate) to the aims stated in the student's Annual Report.**

12. Is the Committee in agreement with the student's aims and priorities for the next 12 months as stated in the student's Annual Report?  
yes    no

If not, please explain briefly below:

If the committee feels that certain minimal goals must be achieved in order for the student to remain in good standing in the graduate program, please specify these below:

13. Is the Committee in agreement with the student's proposed thesis outline and plan for graduation (if such has been presented)?  
yes    no

If not, please explain briefly below:

14. Provide additional comments (e.g., areas where student should aim for improvement), if desired.

**Name of Committee Chair** \_\_\_\_\_

**Signature of Committee Chair** \_\_\_\_\_