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**THE UNIVERSITY OF BRITISH COLUMBIA**

Biochemistry and Molecular Biology Graduate Program

**Handbook for Graduate Students and Faculty  
in Biochemistry and Molecular Biology**

**November, 2017**

**Please note:** This handbook was created by the Biochemistry and Molecular Biology Graduate committee with input from the Biology Graduate Program Committee and the Chemistry Graduate Program Committee as well as relevant sections from both of these programs. Some aspects are consistent across all 3 graduate programs but differences are described herein.

The handbook was created to assist both students and faculty throughout the graduate degree programs and to serve as a resource for processes and policies. Please let us know if there is additional information that you would like to see in this guide or any changes that would make it easier to use.

The information in the handbook is subject to change. Please refer to the most updated version available from the Biochemistry and Molecular Biology Graduate Coordinator.

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## **Introduction to the Biochemistry and Molecular Biology Graduate Programs**

The Biochemistry and Molecular Biology (BIMB) Graduate Program offers M.Sc. and Ph.D. degree programs that are research intensive and academically balanced. Students that choose to study biochemistry or molecular biology do so for a number of reasons. They may be fascinated with the vast and complex number of chemical reactions that take place in the cell. They may want to understand how pathogens or inborn genetic errors manifest into disease states. They could be interested in engineering macromolecules to perform new functions for use in industry. The BIMB provides current and future students with advanced training and development in leading edge research. It will place a strong emphasis on career development (i.e. writing grants/papers, knowledge translation, public presentations) so that when students graduate, they will have the necessary skill set for future careers in academia or industry. The program strives to foster interdisciplinary and collaborative studies in a collegial atmosphere.

Much of the material in this handbook is taken from program documents for the BIMB Graduate Program as approved by the UBC Okanagan Senate. Other forms, processes and information have been developed by the BIMB Graduate Program Committee in collaboration with the Office of Graduate Studies (Okanagan), the Biology Graduate Program Committee, the Chemistry Graduate Program Committee and the Faculty of Graduate Studies (Vancouver).

### **Overview of Program Requirements**

The M.Sc. and Ph.D. Biochemistry and Molecular Biology degrees are centered on conducting original research. Students will learn the theoretical, technical, analytical, and communication skills needed to perform timely and groundbreaking research. The work will be original and of suitable quality for publication in peer-reviewed journals. The processes described here are designed to support student learning and enable research excellence.

### **Links to UBC Policies Regarding Graduate Studies**

The following websites give important information regarding Graduate Studies at UBC.

The responsibilities of a graduate student are outlined at the following website:

<http://www.grad.ubc.ca/current-students/student-responsibilities>

Definition of academic freedom to conduct research is found here:

<http://www.grad.ubc.ca/faculty-staff/policies-procedures/academic-freedom>

Specific policies related to Intellectual Property and publication of research findings are found here:

<http://www.grad.ubc.ca/faculty-staff/policies-procedures/intellectual-property>

Detailed advice on student responsibilities and recommendations for success are found here:

## Library Resources to Increase Graduate Student Success

Gosling, P., & Noordam, B. (2006). *Mastering your PhD: Survival and success in the doctoral years and beyond*. New York: Springer. Call Number: LB2386 .G67 2006

Grix, J. (2001). *Demystifying postgraduate research: From MA to PhD*. Edgbaston, Birmingham, UK: University of Birmingham Press. Call Number: LB2371.6.G7 G75 2001

Mullen, C. A. (2006). *A graduate student guide: Making the most of mentoring*. Lanham, MD: Rowman & Littlefield Education. Call Number: LB2371.4 .M85 2006

Potter, S. (Ed.). (2006). *Doing postgraduate research (2nd ed.)*. Thousand Oaks, CA: Open University Press. Call number: LB2371 .D65 2006

Rugg, G., & Petre, M. (2004). *The unwritten rules of PhD research*. Maidenhead, UK: Open University Press. Call Number: LB2386 R84 2004

Tinkler, P., & Jackson, C. (2004). *The doctoral examination process: A handbook for students, examiners and supervisors*. Maidenhead, UK: Open University Press. Call Number: LB2371.6.G7 T56 2004

Wallace, M., & Wray, A. (2006). *Critical reading and writing for postgraduates*. Thousand Oaks, CA: Sage publications. Call Number: LB2395.3 .W35 2006

## The Graduate Student's Responsibilities

When you register as a graduate student at UBC, you're making a commitment to devote the time and energy needed to engage in research and write a thesis or dissertation. Your supervisor has a right to expect substantial effort, initiative, respect and receptiveness to suggestions and criticisms.

As a graduate student, you must accept the rules, procedures and standards in place in the program and at the university and should check the University Calendar for regulations regarding academic and non-academic matters. You are expected to:

- Make a commitment and show dedicated efforts to gain the background knowledge and skills needed to pursue your research project successfully.
- In conjunction with your supervisor, develop a plan and timetable for completion of all stages of your thesis project, adhere to a schedule and meet appropriate deadlines.
- Meet with your supervisor when requested and report fully and regularly on progress and results.
- Maintain registration throughout the program and (for international students) ensure that study permits and (where applicable) employment authorization documents are kept up to date.
- Register twice a year in Sept and April.
- Keep your supervisor, graduate program advisor and enrolment Services informed about your contact information.
- Give serious consideration to the advice and criticisms received from your supervisor and other members of your supervisory committee.
- Keep your work space tidy, safe and healthy; show tolerance and respect for the rights of others.

- Be thoughtful and reasonably frugal in using resources provided by your supervisor and the University, and assist in obtaining additional resources for your research or for other group members where applicable.
- Conform to University, Faculty and graduate program requirements, including those related to deadlines, dissertation or thesis style, conflict of interest.

The following suggestions can make your life a lot easier:

- Review the literature regularly and keep your literature survey up-to-date
- Maintain exemplary records of your experimental/theoretical work (so that others can replicate your results)
- While your supervisor is required to be reasonably available for consultation, it is your responsibility to keep in touch with your supervisor
- Make yourself available to your supervisor for regular meetings at mutually acceptable times
- Follow the university's policy regarding ownership of intellectual property

## **The Supervisor's Responsibilities**

Your supervisor is the key person in your graduate degree program. Graduate education is greatly affected by the nature of the supervision and the quality of communication between graduate students and their supervisors. When students work closely and effectively with their graduate supervisors, they will improve the quality of their research, their dissertations or theses and their educational experiences.

Supervisors should be available to assist their graduate students at every stage of the degree, from formulation of their research projects through establishing methodologies and discussing results to presentation and possible publication of dissertations. Graduate supervisors must also ensure that their students' work meets the standards of the University and the academic discipline. The following points outline the major responsibilities of a graduate supervisor:

- Assists the student with the selection and planning of a suitable and manageable research topic.
- Discusses the student's academic progress and research regularly. The frequency of meetings will vary according to the stage of work, nature of the project, and the independence of the student.
- Establishes (with input from the student and colleagues where appropriate) a supervisory committee, and convenes a meeting, at least annually, to evaluate the student's progress.
- Responds in a timely and thorough manner to written work submitted by the student, with constructive suggestions for improvement and continuation. The turnaround time for comments on written work should not normally exceed three weeks.
- Makes arrangements to ensure continuity of supervision when the supervisor will be absent for extended periods, e.g. a month or longer.
- When necessary, assists the student in gaining access to facilities or research materials.
- Ensures that the research environment is safe, healthy and free from harassment, discrimination and conflict. When there is a conflict in advice or when there are different expectations on the part of co-supervisors or members of the supervisory committee, the supervisor is expected to endeavor to achieve consensus and resolve the differences.
- Assists the student in being aware of current graduate program requirements, deadlines, sources of funding, etc.

- Encourages the student to make presentations of research results within the University and to outside scholarly or professional bodies as appropriate.
- Encourages the student to finish up when it would not be in the student's best interests to extend the program of studies.
- Acknowledges appropriately the contributions of the student in presentations and in published material, in many cases via joint authorship.
- Ensures that recommendations for external examiners of doctoral dissertations are made to the graduate program advisor and forwarded to the Faculty of Graduate Studies in a timely manner.
- Assists the student to comply with any changes that need to be made to the thesis after the thesis or dissertation defence.

## **Forming a Graduate Student Advisory Committee**

Supervisory committees should be chosen within the first term you are on campus. Committee members should be chosen with consideration of their research expertise, time availability, and interest in your research topic. The committee should be formed in consultation with the supervisor. Advisory committees for MSc and PhD students should consist of at least 3 faculty members, respectively including the supervisor.

Committee members are responsible for offering advice, reading and commenting on proposals and thesis drafts in a timely fashion (typically within 2 weeks), and attending committee meetings; committee members will sit on comprehensive exams (Ph.D. students) and a thesis defense. In some cases, committee members may also be your research collaborators and the work that you do might involve publication with committee members; in many cases, however, committee members are advisory rather than participatory in the research.

### **Conflict of Interest**

Faculty members who have partners/spouses at UBCO must be very careful to ensure that there is no perceived conflict of interest or commitment with respect to graduate students or co-supervised graduate students. Since supervision of graduate students is part of what is considered for reappointment, promotion and tenure, and for merit and PSA, it is important that there not be a real or perceived conflict of interest.

- If a partner/spouse co-supervises a graduate student, the committee for that graduate student should be expanded to include another faculty member.
- If a partner/spouse sits on the committee for a graduate student, the committee should be expanded to include another faculty member.
- Partners of faculty members supervising graduate students should not sit on the examining committee for that graduate student or on the defense committee.
- Faculty members who have partners/spouses at UBCO should not be involved in evaluating applications of students for graduate studies who will have the partner as a supervisor, nor should they evaluate applications for scholarships or fellowships for graduate students supervised by their partner.

## Committee Meetings

Committee meetings must be held at least annually to review your progress towards the degree. However, during the first year (M.Sc.) or two years (Ph.D.), meetings may be more frequent as you address the coursework and develop your proposed research. An initial committee meeting should be held during the first semester to discuss timelines, expectations for degree completion and to discuss any required coursework. The supervisor will chair each meeting, and the committee is tasked with: (a) reviewing your progress towards completing the degree and offering recommendations and guidance about the next stages of the program; (b) approving any coursework towards the degree; (c) ensuring that the supervisor and student agree to the package of financial support for the academic year. The student is encouraged to arrange their own committee meetings, with the exception of the first one, which the supervisor should arrange.

At least by the end of the 2nd year (M.Sc.) or 4th year (Ph.D.), the committee will ask for a final timeline for thesis completion and defense; most committees like to see suggested timelines annually. Beyond 3 years in a M.Sc. program and 5 years in a Ph.D. program, the committee must approve annual extensions. After 5 years in a M.Sc. or 6 years in a Ph.D., a student will be asked to leave the program unless they obtain the permission of the Dean of the College of Graduate Studies (CGS) to continue.

At least one week in advance of each committee meeting, students are responsible for providing their committee with a short synopsis (usually 2-4 pages) of their progress and projected timelines. Notes on the committee meeting will be prepared by the supervisor, signed by the graduate student and by the committee members, and added to the graduate student's file.

Committee meetings are important: there are only a few times during the degree when you will meet with your entire committee. Sometimes issues will emerge that have not come up in your one-on-one discussions with your supervisor or committee members. It therefore pays to be well prepared going into each committee meeting.

## How to prepare for committee meetings

- Discuss the purpose of the upcoming committee meeting with your supervisor.
- Be sure that you prepare your progress synopsis carefully. It is a good idea to have your supervisor read it for you before sending it to your committee.
- Bring copies of relevant materials. You probably should bring at least one spare copy in case someone has not printed out or brought with them material you sent in advance of the meeting.
- Remember that the committee is there to help you; you should prepare notes for yourself (and sometimes formalize these as part of the agenda) of what you want out of the meeting so that you can be sure your questions and needs are addressed.
- Reserve or bring AV equipment if needed and make sure that it is functional. Be on time, organized and ready to begin as soon as the committee arrives.
- It often helps if you are in regular contact with committee members outside of the formal meetings, so that concerns can be dealt with as they arise rather than accumulating and so that your committee members get an idea of how you approach problems and respond to feedback. These regular contacts often make the formal committee meetings less stressful and more useful.



## During the committee meeting

- Follow the prepared agenda. If other topics arise, give them separate time in the agenda, but be sure all agenda items are addressed.
- Take notes. It is a good idea to circulate these to committee members to ensure that you and the members of the committee are clear on what 'action items' or decisions have been reached.
- Be sure you are clear about who needs to know when you have accomplished particular things (e.g. are you submitting a form to a grad secretary, meeting later with your supervisor, or reporting back at another committee meeting?). Ask for clarification as often as needed; it is a bad thing when the committee thinks they've told you one thing, but you've heard another.
- If a topic arises that is really between you and one other person, ask the group if the two of you can have that conversation later or if it should be held here (e.g. if there is a question around a particular technique that one of your committee members is helping you learn).
- Work from your list of questions / needs to ensure you get the advice and help you need.
- Be aware that people differ in how they give feedback. Sometimes it comes across really harshly, even when it is intended by the speaker to be useful. Try to separate the advice from the way in which it is given.
- It is useful to have a post-meeting debriefing with your supervisor, especially if you have any concerns about how the meeting went or what you are being asked to do.

## Annual Progress Reports

An annual progress report must be completed by the supervisor and the student by June 1<sup>st</sup> of each year. The form is found at:

<http://gradstudies.ok.ubc.ca/forms/annprog.html>

You will be asked to report on your progress to date, courses taken, funding awarded, grants or, scholarships received, teaching assistantships, publications, conference presentations, and your plans for the upcoming year.

## Course Work

### Total Credit Requirements

#### 30 credits for a M.Sc.

All M.Sc. students will be required to complete a M.Sc. thesis (18 credits) and participate in a seminar course, BIOC 530 (3 credits). The remaining two courses are electives and are chosen in consultation with the supervisor.

Overall, the course requirements are:

|          |                                       |            |
|----------|---------------------------------------|------------|
| BIOC 549 | MSc Thesis                            | 18 credits |
| BIOC 530 | Biochemistry Seminar                  | 3 credits  |
|          | Science elective courses <sup>a</sup> | 6 credits  |
| Total    |                                       | 30 credits |

M.Sc. students who wish to transfer to the Ph.D. program must complete 6 credits of coursework at the 500-level and complete 6 credits of coursework with at least an 76% average within 24 months of entering the program. Clear evidence of research ability, progress and potential must also be shown as determined by the students' advisory committee.

#### 12 credits for a Ph.D.

A student entering a PhD program who has completed a MSc degree or has an equivalent background, is required to take courses at the discretion of the supervisory committee. If the student does not have an MSc in a relevant field or does not have sufficient previous coursework, the supervisory committee can recommend up to three elective courses.

Overall, the course requirements are:

|          |                                       |            |
|----------|---------------------------------------|------------|
| BIOC 649 | PhD Thesis                            | 0 credits  |
| BIOC 530 | Biochemistry Seminar*                 | 3 credits  |
|          | Science elective courses <sup>a</sup> | 9 credits  |
| Total    |                                       | 12 credits |

<sup>a</sup> Science elective courses include the following:

- Biochemistry, Chemistry, or Biology graduate (at 500-level) or undergraduate courses numbered 400 or higher.
- Suitable courses numbered 300 or higher offered by other programs

<sup>b</sup> BIOC 530 is a required course, unless BIOC 530 or a similar graduate level course was previously taken as an M.Sc. student.

MSc and PhD students are expected to take their required courses from more than one faculty member.

## Transfer requirements

Students who transfer into the BIMB Ph.D. program from the M.Sc. program or who already have an M.Sc. in a relevant discipline will be given credit for previous course work of up to 12 credits, this includes three credits of the BIOC 530 seminar course. In all cases, a student's advisory committee may assign additional courses for training and research purposes.

## Other Academic Requirements

To complete the M.Sc. program, a candidate must fulfill the following requirements:

- Submission of a written research thesis and a successful oral defense of the thesis.
- An average of 76% (B+) must be achieved across all course work taken for credit.
- A minimum of 72% (B) must be achieved in every course taken for credit or the student will be deemed to have failed the course.
- Where a grade of less than 72% is obtained in a course, upon the recommendation of the student's advisory committee, the student may repeat the course for higher standing or take an alternative course. When repeating a failed required course, a minimum mark of 76% must be obtained otherwise the student will be required to withdraw from the program.

To complete the Ph.D. program, a candidate must fulfill the following requirements:

- Completion of comprehensive oral examination normally held after completion of all required course work. If the comprehensive examination is failed, the student may undergo re-examination, but a second failure will require withdrawal from the Ph.D. program.
- Submission of a written research thesis and successful oral defense of the thesis.
- An average of 80% (A-) must be achieved across all course work taken for credit.
- A minimum of 76% (B+) must be achieved in every course taken for credit.
- Where a grade of less than 76% is obtained in a course, upon the recommendation of the student's advisory committee, the student may repeat the course for higher standing or take an alternative course. When repeating a failed required course, a minimum mark of 80% must be obtained.

**M.Sc. and Ph.D. candidates may be required to withdraw if progress has not been satisfactory as shown by course work that does not meet the above requirements, courses with incomplete standing, unsatisfactory progress on the thesis, or failure to satisfy additional requirements as determined by the advisory committee.**

## Teaching Assistantships

All graduate students are required to act as teaching assistant for undergraduate courses. M.Sc. students are required to TA for at least one semester (one lab per semester) and Ph.D. students for at least 2 semesters (one lab per semester). This requirement helps graduate students learn how to communicate scientific information effectively. Graduate students will have opportunities for mentorship to improve teaching.

The Center for Teaching and Learning has a number of excellent programs to develop skills and techniques to improve teaching. Workshops and resources for graduate students are found at:

<http://www.ubc.ca/okanagan/ctl/about.html>

### MASTER'S STUDENTS.

The Masters' students will take the following examinations:

- Course examinations where applicable.
- Public oral examination of the thesis.

The thesis may be submitted at any time of the year, but candidates are advised to allow ample time for revision and examination. It is understood that, as the thesis is being written, the candidate will be in regular communication with the advisory committee. When a draft is completed, which the advisory committee recommends for examination, the student may request in writing to the Graduate Program Coordinator that an examination of the thesis be held. Arrangements for the final oral examinations are then made.

### DOCTORAL STUDENTS.

Ph.D. students are required to pass a comprehensive exam. The exam is based on the proposed research and comprehensive knowledge of biochemistry and molecular biology. After passing this examination and all required course work, then students are admitted to candidacy and will submit a thesis upon completion of research.

### The PhD Comprehensive Examining Committee

The committee consists of the student's advisory committee including the advisor, plus a chair, and external examiner. It is encouraged that the Chair and external examiner have graduate supervision experience. The Chair will normally not vote on the outcome of the examination. If the vote on the outcome of the examination is tied, then the chair has the deciding vote.

### Thesis

#### Comprehensive Examination Details

This oral examination tests the student's overall knowledge of biochemistry and molecular biology, with particular emphasis on fundamental material oriented towards the student's chosen branch of the field. The exam also serves as a formal approval of the student's proposed research program. Upon passing the exam the student is deemed a Ph.D. candidate. The exam is conducted as follows.

- A research proposal is given to all members of the examination committee at least three weeks before the exam.
- The examination committee consists of the advisor, two members of the student's advisory committee, one external examiner and a Chair to be chosen by the BMB Graduate Coordinator. The chair will coordinate the results of any examination relative to those of all other examinations and does not vote except in the case of a tie.
- The candidate will give a short seminar on his/her research plan / progress (maximum 20 minutes).
- Examinations should be 2 to 2½ hours in length and should not be scheduled if less than a 3-hour period is available.
- The advisory committee will be encouraged and expected to ask the students a broad range of questions that examine their depth and scope of knowledge in their chosen field of study.
- At least half of the exam should involve questions of a fundamental or comprehensive nature. The examining committee expects to find:
  - Strong analytical, problem-solving and critical thinking abilities
  - Required breadth and in-depth knowledge of the discipline
  - Required academic background for the specific doctoral research to follow
  - Ability to conduct independent and original research
  - Ability to communicate knowledge of the discipline
- The recommendations of the examination committee fall into three categories:
  - Pass – The student passes the exam and becomes a Ph.D. candidate.
  - Conditional – The examining committee has identified weak areas in the student's knowledge and requires that the student fulfill one or more conditions to remedy the deficiencies. The committee may require the student to be re-examined. Any re-examination must take place within six months of the original examination and questions must be based on those areas where the student's knowledge was found to be deficient. The committee must then reach a decision of Pass or Fail.
  - Fail – The student fails the examination but may request a second comprehensive examination to occur within six months, but no sooner than three months, from the date of the Fail designation.
- If a student fails the Comprehensive Examination a second time then the student must withdraw from the program.

## **PhD Thesis Proposal**

PhD students must present a research proposal to their committee prior to their comprehensive exam.

## **Writing a Research Proposal**

- Research proposals should be an appropriate length for the research topic and approach but generally not more than 25 double spaced pages in length, but could be much shorter as determined appropriate by the Student’s Advisory Committee
- A typical proposal has the following suggested format but the format may vary as appropriate for individual projects:
  1. Project Summary
    - A. Statement of Problem and Significance
    - B. Introduction and Background
      - Relevant literature data
      - Preliminary data
      - Conceptual or empirical model
      - Justification of approach or novel methods
    - C. Research Plan
      - Overview of research design
      - Objectives, hypothesis, methods
      - Analysis and expected results
      - Timeline
  2. References Cited
  3. Appendices, figures or tables in support of background information

## **Ideas on preparing a research proposal**

- Read widely. It may help to ask your supervisor or committee for suggested readings, but of course you will also need to read well beyond what they recommend.
- Read some other proposals to see how other students have tackled their proposals.
- Discuss your ideas with other grad students, your supervisor, and committee members.
- Start writing early; expect that you will revise and revise and revise this document.
- Someone reading your proposal should be able to tell what question(s) you will address, why the topic is interesting, how you will approach the problem, the types of data you will collect, and how your research will advance the field. Give drafts of your proposal to friendly readers and ask them to answer those questions to see how well you did at conveying your ideas.
- A good resource for writing proposals is:  
Friedland AJ, Folt CL (2009) Writing successful science proposals 2<sup>nd</sup> Edition. Yale University Press. ISBN 978-0-300-11939-8

## **Guidelines**

A final written thesis must be prepared and defended for the degree to be awarded. Guidelines for preparation of the thesis are online:

The Thesis / Dissertation Formatting Checklist is here:

[http://gradstudies.ok.ubc.ca/\\_\\_shared/assets/forchek36775.pdf](http://gradstudies.ok.ubc.ca/__shared/assets/forchek36775.pdf)

Thesis and Dissertation Information is found here:

<http://gradstudies.ok.ubc.ca/forms/thesis-initiating-exam.html>

Formatting guidelines are found here:

<http://gradstudies.ok.ubc.ca/current-students/thesis-dissertation-info.html>

## **Thesis Oral Examination**

The thesis may be submitted at any time during the year, but candidates are advised to allow ample time for revision and examination. It is understood that, as the thesis is being written, the candidate will be in regular communication with the advisory committee. When a draft is completed which the advisory committee recommends for examination, the student may formally request an examination. All doctoral theses must be assessed by an examiner external to the UBC Okanagan campus, as well as by internal examiners. The College of Graduate Studies makes arrangements for the final oral examinations and in consultation with the Graduate Program Coordinator, will choose the external examiner. A copy of the final draft is then sent to the external examiner. The external examiner's written report must be received before the final examination of the thesis can take place. It is understood that as a result of the final oral examination corrections may be necessary to produce a revised final draft of the thesis.

## **Problem Solving**

If you encounter problems during your graduate program, you should notify your supervisor immediately. If the problem involves the supervisor, you're advised to speak to a member of your supervisory committee. If the problem cannot be solved, then you should speak to the BMB Program Coordinator.

## **Concluding Comments**

We welcome you into the Biochemistry and Molecular Biology graduate program. We hope that you find the program stimulating and a good learning experience. Take a minute to read some comments from other graduate students that could help you in your journey through graduate studies: