

CMB

Cellular, Molecular *and* Biomedical Sciences

The University of Vermont

2019 – 2020  
GRADUATE PROGRAM  
HANDBOOK

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## **INTRODUCTION**

The Cellular, Molecular and Biomedical Sciences Program began as a cross-college graduate program in Cell Biology over 40 years ago. Today, this Program includes faculty from four Colleges and reports to the Dean of the Graduate College. The objectives for students in the CMB Program are:

- To become scholars in their field;
- To attain a core set of knowledge within cellular, molecular and biomedical sciences;
- To understand, design and undertake a hypothesis-based approach to research in an ethically responsible manner;
- To think independently, creatively, and critically;
- To be effective in both written and oral forms of communication as teachers, researchers, and scholars.

This Program Handbook serves as a reference for graduate students and faculty within the CMB Program. The contents of this handbook will be reviewed and approved annually by the CMB Steering Committee. Suggested changes to the handbook should be made to the Program Director or members of the Steering Committee.

## **PROGRAM ADMINISTRATION**

The Director will be appointed by the Dean of the Graduate College. Please see Supporting Information Links for [Bylaws](#) and [MOU](#) for more details on the appointment and responsibilities of the CMB Director as well as a description of subcommittee structure and responsibilities within the Program.

Administrator (TBA) and Administrative Assistant, Haley Bradstreet support the CMB Program and are available to assist students and faculty in support of graduate student mentoring and education within the CMB Program.

Contact information for Haley is listed below:

Administrator

TBA

Level 3 South

Given Courtyard, S352

802-656-9673

Administrative Assistant

Haley Bradstreet

Level 3 South

Given Courtyard

802-656-9677

[Haley.Bradstreet@uvm.edu](mailto:Haley.Bradstreet@uvm.edu)

## **FACULTY RESPONSIBILITIES**

### **GENERAL EXPECTATIONS**

The CMB Program is comprised of faculty who are committed to training the next generation of scientists. Faculty in our Program are expected to maintain a high level of performance and professionalism in mentoring students. CMB Faculty are expected to:

- Participate in programmatic functions including subcommittees, seminar series and the annual retreat
- Be active members on dissertation and thesis committees
- Meet with their students on a regular basis to discuss future career goals and degree expectations
- Provide students with a safe environment for learning and developing scientific skills
- Ensure that students meet with their dissertation committee at least annually and provide written feedback to the student on their annual Progress Report Form
- Provide opportunities for their students to present their research at national/international meetings
- Complete required paperwork for rotation students and sign the Mentor Commitment Form when agreeing to train a student through her/his PhD
- Make a good faith effort to find funding for a student who has joined their laboratory for dissertation training
- Work with the program to ensure stable financial support throughout their student's dissertation training
- Respect the teaching responsibilities of students funded by the program

For more information, please refer questions regarding reappointment to the CMB Program to the Faculty Membership Committee.

### **SPONSORING A ROTATION STUDENT**

It is the rotation advisor's responsibility to complete a Rotation Agreement Form within 2 weeks of the start of a rotation, as well as to complete a Rotation Evaluation Form at the end of the rotation. The rotation advisor is to discuss the evaluation with the student, and to submit the Rotation Evaluation Form to the CMB Program Administrative Office no later than 2 weeks after the end of the rotation. Timely completion of rotation evaluations is necessary for faculty to remain in good standing with the Faculty Membership Committee, for the student to receive valuable feedback on their laboratory skills and research progress and for a grade to be assigned to the student for their rotation. In addition, the rotation evaluations may prompt a discussion of the potential for completing the student's dissertation research in that laboratory.

At the end of each semester, a formal grade for the research credits is awarded by the Director based upon the information provided in the rotation evaluation. Students who earn an unsatisfactory for their rotation may be placed on academic probation.

## **GRADUATE STUDENT RESPONSIBILITIES**

### **LABORATORY ROTATIONS**

Rotations give students hands-on laboratory experience, provide training in experimental design, and assist them in choosing a lab for their dissertation research. Students will perform 3 rotations (in at least 2 distinct labs) during their first year that will last a minimum of 8 weeks and a maximum of 12 weeks. Students who seek a 2<sup>nd</sup> rotation in a lab in which they rotated earlier will require approval from the Student Progress Committee. Students who seek a 4<sup>th</sup> rotation may do so only after approval by the Student Progress Committee.

Recommended dates to begin each rotation will be listed at the beginning of the academic year.

<b>Rotation Schedule 2019-2020</b>	<b>Date</b>	<b>Length (weeks)</b>
<b>Start</b>	Mon, Aug. 26 2019	
Draft of Rotation paper due to advisor	Mon, Nov. 4, 2019	<b>11</b>
<b>End/Paper due</b>	Fri, Nov. 8, 2019	
<b>Start</b>	Mon, Nov. 11, 2019	<b>13</b>
Draft of Rotation paper due to advisor	Mon, Feb. 3, 2020	(Includes 2 week holiday break)
<b>End/Paper due</b>	Fri, Feb. 7, 2020	
<b>Start</b>	Mon, Feb. 10, 2020	
Draft of Rotation paper due to advisor	Mon, Apr. 20, 2020	<b>11</b>
<b>End/Paper due</b>	Fri, Apr. 24, 2020	

At the beginning of each rotation, the student and rotation advisor will complete a Rotation Agreement Form and submit it to the CMB Program Administrative Office no later than 2 weeks after the start of the rotation. A failure to submit the Rotation Agreement Form to the Program Office may result in an unsatisfactory grade for the rotation. If, for any reason, a student is unable to start a rotation on schedule, it is the student's responsibility to inform their faculty advisor of their status. A failure to do so may result in an unsatisfactory grade for the rotation.

For each rotation, a Rotation Report should be prepared with the assistance of the rotation advisor to ensure accuracy. There is no required format but students will write a succinct report for each rotation (approximately 1-2 single-spaced pages) that includes:

1. a short summary/abstract
2. background
3. hypothesis and/or objectives
4. results and discussion

A short bibliography may also be included. Experimental data may be included in the rotation report and there is no penalty for making the report longer in order for it to be comprehensive.

The final Rotation Report should be submitted to the CMB Program Administrative Office prior to the beginning of the next rotation. Failure to submit the Rotation Report to the Program Office on time may result in an unsatisfactory grade for the rotation. It is the rotation advisor's responsibility to complete a Rotation Evaluation Form at the end of the rotation. The rotation advisor is to discuss the evaluation with the student, and to submit the Rotation Evaluation Form to the CMB Program Administrative Office no later than 2 weeks after the end of the rotation. Timely completion of rotation evaluations is necessary for the student to receive valuable feedback on their laboratory skills and research progress and for a grade to be assigned to the student for their rotation. In addition, the rotation evaluations may prompt a discussion of the potential for completing the student's dissertation research in that laboratory.

Based on the performance of the student during rotations, a formal grade for research credits is awarded by the CMB Director at the end of each semester. The CMB Director will assess the Rotation Report and Rotation Evaluation and assign a grade of S=SATISFACTORY OR U=UNSATISFACTORY. When UNSATISFACTORY, the Director will provide feedback to the student, the advisor, and the Student Progress Committee. A Rotation Report deemed unsatisfactory may result in the student being asked to revise the report or being placed on academic probation.

#### **SEMINAR SERIES**

The CMB Program holds a weekly seminar for students to present their current dissertation research to the UVM community. All students are expected to attend and participate in seminars while in the CMB Program. Second year students and beyond will present an annual formal seminar that describes their research, including background, methods, results, and discussion. CMB faculty and students will submit Seminar Evaluations to the CMB Program Administrative Office after each presentation. These

evaluations will be shared with each student speaker in an effort to improve their presentation skills.

### **TEACHING**

The University of Vermont values the connection between graduate and undergraduate education and the skills it takes to be an educator. To support each, the University has determined teaching to be a valuable skill set for graduate students. The Graduate College requires all students in PhD Programs to have a teaching experience. With the CMB Program, students are required to have two semesters of a teaching experience, within their first two years.

Students within the CMB Program are required to teach at least two courses. Students will be assigned to teach once during their first year, and once during their second year. CMB students will be assigned to teach the following courses: MMG 65, 101, 104, 201, 203, 222; BIOC 205, 206, 207; BCOR 011, 012, 101, 103; and BIOL 001, 002. This list is not exhaustive and other courses may be assigned as needed. Undergraduate courses with laboratory sections take priority for teaching assignments.

A Graduate Teaching Assignment (GTA) Committee, members of which are appointed by the Dean of the Graduate College, will determine the teaching assignments. The responsibilities of the GTA Committee are to identify graduate students on CMB Program support that have the qualifications to serve as Teaching Assistants for courses in the sciences supported by the CMB Program. The GTA Committee will meet annually in early summer to determine teaching assignments for the upcoming year. The CMB Program Office will contact lab coordinators to obtain teaching evaluations on a semester basis from the instructor/lab coordinator and the students attending the class.

The GTA Committee does not play a role in the CMB programmatic requirements. The Committee does not have representation on the CMB Steering Committee but closely communicates with the CMB Program through the Director on any issues or conflicts with assignments.

### **DISSERTATION COMMITTEE**

All students are encouraged to choose their Dissertation Committee (also called a Studies Committee by the UVM Graduate College) early within their second year to provide feedback for future course work, concentration selection, Phase II Comprehensive Exam stretch aim topic and input on research plans. All students must meet with their Dissertation Committee by August 31 of their second year and at least annually thereafter.

A student's Dissertation Committee consists of a minimum of four UVM Graduate Faculty members; the student's advisor and at least two other CMB faculty. The Chair of the Committee should be a CMB Faculty member who does not have an appointment in the Advisor's home department. Traditionally, this committee serves as the Dissertation Defense Committee (see [Graduate College website](#) for more information).

The student and advisor must submit a copy of the Student Progress Form, including a written summary of the student's academic and research progress and the recommendations of the Dissertation Committee to the CMB Program Administrative Office within two weeks after the committee meets each year.

The Student Progress Committee will review the submitted summary of each student's performance and report to the Steering Committee and Director any students who are on academic probation or are performing poorly in the Program (this may be due to academic performance, research performance, teaching assignments, professionalism, etc.). Based on this assessment, students who continue to fail to maintain satisfactory standards are subject to dismissal from the Program and/or loss of funding.

Typically, the Dissertation Committee will also serve as the Dissertation Defense Committee. The composition of the Dissertation Defense Committee and the name of the advisor must be submitted to the Graduate College prior to the Dissertation Defense. For more guidelines on the Dissertation Defense and Committee responsibilities, please visit the [Graduate College website](#).

#### **GRADUATE STUDENT FUNDING**

During the first two years, students will be supported by a Graduate Teaching Assistantships (GTA) from the CMB Program. Students holding a GTA position should commit 20 hours per week to teaching or research responsibilities associated with the assistantship in addition to their own studies and laboratory work.

Students in the CMB Program will be fully supported for a minimum of 5 years, as long as they are making satisfactory progress towards their degree. The Program expects that all graduate student advisors provide full financial support for their student(s) after their second year in the Program. In the event that the advisor cannot support the student, the expectation is that the Department Chair/Dean will assume full financial responsibility. If laboratory funding is not available from the mentor, the faculty advisor should approach their Department Chair and Dean to identify support for CMB students within their labs. If support cannot be identified, CMB students in good standing may be supported by a Graduate Teaching Assistantship (GTA) beyond their second year. In accordance with

Graduate College policy, students must maintain at least part-time enrollment to be funded by the Program or Department.

Students within the CMB Program are considered full-time if they are enrolled for 9 credits each semester and 5 credits during the summer. Students supported by a GTA/GRA through the Program are eligible to register for 9 credits each semester and 5 credits during the summer. Students who are actively working toward their degree and have satisfactorily completed all credits required for the degree, but have not completed their dissertation research, must enroll each semester for Continuous Registration. Students who are working at the full-time level of nine or more credit equivalency should register for GRAD 903 Cell & Molecular Bio. Students working at less than full time, but at least half time (five to eight credit equivalency) should register for GRAD 902 Cell & Molecular Bio.

CMB students will receive a stipend of \$30,000 per year, a full tuition scholarship covering up to a maximum of 23 credits per year, and full health insurance coverage. Students are required to pay their own comprehensive, graduate student senate and health center fees. Faculty advisors/departments are responsible for maintaining this level of support for students beyond their second year.

More information about funding opportunities can be found by visiting the Graduate College website, [Funding Your Graduate Education](#).

#### **TERMINAL CMB MASTER'S DEGREE**

The CMB program only awards M.S. degrees to students who have matriculated into the Ph.D. program, and their studies committee has determined that their academic progress (research included) is not sufficient to complete a Ph.D. The student must be in good standing with the program, and will have successfully completed Phase 1 of the Comprehensive Exam. Furthermore, the student must complete the minimum course and research requirements for the M.S. as defined by the Graduate College, and must defend a research-based master's thesis. For further information, please refer to the [Graduate College Requirements for the Master's Degree](#).

#### **LEAVE OF ABSENCE**

CMB students may request a leave of absence from the Program for up to one year. For more information, please read "[Policies and General Information: Leave of Absence for Graduate Students](#)" on the UVM website.

#### **RESPONSIBILITIES OF COMMITTEES WITHIN THE CMB PROGRAM**

For more information regarding the Standing Committees of the CMB Program, please refer to the [Bylaws](#).

## **RECRUITMENT AND ADMISSIONS**

This Committee has two major responsibilities. The first involves increasing the national recognition of our Program, organizing Program promotion activities, and recruiting outstanding candidates to apply to our Program. This Committee is also responsible for reviewing applications each year, and making recommendations of the most qualified applicants to the Director for admissions into the CMB Program.

The Director and Steering Committee will provide the Recruitment and Admissions Committee a target number of students to matriculate and a recruitment budget for each year. This number will be provided to the Committee in December.

Applications to the CMB Program should be submitted online directly to the Graduate College. The Recruitment and Admissions Committee will review completed applications beginning December 1. The Recruitment and Admissions Committee will recommend acceptance of outstanding candidates to the Program based on a variety of criteria, including but not limited to, academic record, GRE scores, TOEFL scores (if appropriate), letters of recommendation, previous research experience, interview and perceived fit with the Program.

## **STUDENT PROGRESS**

The Student Progress Committee oversees each student's progress while they are in the Program. In the first year, the Student Progress Committee serves as the Studies Committee for the student until they have selected a Dissertation Committee. This responsibility is then transferred to the Dissertation Committee within the second year.

The Student Progress Committee will meet twice with each student during their 1st year. The first meeting shall occur in mid-December, and the 2nd meeting shall occur at the end of May. The Student Progress Committee and student will discuss progress in courses, progress during laboratory rotations, teaching assignments, completion of Program requirements, and Comprehensive Examination results, when applicable. The Student Progress Committee will work with the student to address any areas that are in need of remediation, and help the student identify and correct any deficiencies.

Members of the Student Progress Committee shall act as the Faculty Advisors to first year CMB students until the student enters a laboratory, after which the Principal Investigator of the laboratory will assume Faculty Advisor responsibilities.

The Student Progress Committee shall ensure that students have submitted a Rotation Agreement Form to the CMB Program Office, no later than 2 weeks after starting work in a laboratory.

The Student Progress Committee shall obtain copies of the Rotation Evaluations for each student from the CMB Program Administrative Office, and will discuss this feedback with the student during their scheduled meetings. The Student Progress Committee will also meet to discuss issues regarding individual student progress, as needed.

After students have entered a laboratory and selected a Dissertation Committee, the Student Progress Committee will annually review the submitted Student Progress Form from their Advisor and Dissertation Committee. The Student Progress Committee will then report to the Steering Committee and Director any students who are on academic probation or are performing poorly in the Program (this may be due to academic performance, research performance, teaching assignments, professionalism, etc.). Based on this assessment, students who continue to fail to maintain satisfactory standards are subject to dismissal from the Program and/or loss of funding.

#### **EDUCATION COMMITTEE**

The Education Committee is responsible for the development and review of all policies relating to the formal educational and professional training requirements for CMB graduate students.

#### *CURRICULAR REQUIREMENTS*

Students must complete a minimum of 30 course credits, 20 research credits and 25 additional course or research credits. Students should not register for more than 75 credits total. Students who earn 75 credits should then register for continuous registration.

Students should register for 9 credits per semester (fall & spring) between elective courses and dissertation research to be a full time student. Students may elect to take 5 research credits in the summer.

Students must hold a GPA of 3.00 or higher to graduate.

Required core courses for all CMB students:

- BIOC 301 General Biochemistry I (3 credits; fall semester)
- BIOC 302 General Biochemistry II (3 credits; spring semester)
- CLBI 301 Cell Biology (3 credits; spring semester)
- CLBI 401 Critical Reading & Analysis (2 credits; spring semester)
- CLBI 402 Biomedical Data Analysis (2 credits; fall semester)
- CLBI 394 Science Communication (3 credits; fall semester)
- MPBP 395 Scientific Grant Writing (2 credits; spring semester)

- MMG 211 Prokaryotic Molecular Genetics (3 credits; fall semester) or MMG 312 Eukaryotic Molecular Genetics (3 credits; spring semester)
- MMG/PBIO 295 Ethics in Graduate Research (1 credit; fall semester) or NSCI 327 Responsible Conduct in Biomedical Research (1 credit; spring semester)

Requests to alter required courses should be made to the Chair of the CMB Education Committee.

#### *TRANSFER CREDITS*

Students who have taken required Program courses at UVM, after completion of a bachelor's degree but prior to admission to the program, may request that they be applied toward their doctoral degree. In addition, students may request that courses taken at other institutions after completion of a bachelor's degree but prior to admission to the program be applied toward their doctoral degree. Students may transfer up to 24 credits. Credit cannot be awarded for courses with a grade lower than B (3.0). A minimum of 15 hours in courses used in compilation of the grade point average must be taken in residence at UVM.

Students must get approval to transfer credits from the CMB Education Committee and the Dean of the Graduate College. Transfer credits for the required core courses in the CMB program would require a demonstrated graduate level curriculum that matches what is presented in CMB courses. However, because successful completion of the qualifying examination requires proficiency in the first-year curriculum, transferring credits for these courses is discouraged. Transfer credits will not be allowed for the ethics requirement.

For more information, please visit the [Graduate College](#) website.

#### *COMPREHENSIVE EXAMINATION*

The pursuit of science occurs due to the efforts of individuals on many levels. The PhD is not simply a linear progression of effort from a B.S. or M.S. degree, but rather a distinct branch of training and expectations. The roots of the PhD in philosophy should not be lost; hence the Doctorate of Philosophy requires its trainees to learn and employ rigorous logic along with knowledge in their chosen field to produce new knowledge. In the case of the CMB program, acquisition of the PhD comes with the expectation that students have been trained to critically, systematically, and independently address scientific questions relating to cellular, molecular, and/or biomedical sciences (hereafter these areas of study will be called CMB). The preceding rationale establishes the purpose and expectations for the CMB Comprehensive Examination.

The Comprehensive Examination is a tool to comprehensively assess each student and ensure that they are prepared to proceed toward the doctoral degree. The goal is that all parts of this examination will be evaluated in such a manner as to avoid bias and ensure uniformity of assessment. In making the assessment, the examination will determine whether the candidate:

1. Has acquired an adequate academic background through required coursework and electives in CMB
2. Can analyze and interpret data and scientific ideas
3. Can apply logical thought to make connections between diverse facts and concepts
4. Understands and meets the intellectual demands of the degree program

The examination is structured to provide assessment in two formats, oral and written. The two phases of this exam occur at distinct times during training and both must be satisfactorily completed to advance to doctoral candidacy.

Please see Appendix I, for detailed information about the Comprehensive Examinations.

#### **FACULTY MEMBERSHIP**

Faculty members of the CMB Graduate Program shall consist of University of Vermont Graduate College faculty who are qualified to guide and advise candidates for a Ph.D. degree in the disciplines associated with Cellular, Molecular and Biomedical Sciences in accordance with the Graduate College and CMB Program standards. Members in good standing will have an independent research program and be willing to participate in the educational and administrative missions of the CMB Program.

Approval of new faculty members entails review of a letter requesting membership and explaining interest in the program, along with curriculum vitae. The committee vote is reported to the Steering Committee. Membership in CMB will be contingent upon membership in the Graduate College.

Renewal of membership every three years entails the faculty member providing details of participation in the program ( $\geq 10$  hours per year) over the previous three years. Ways to participate include:

- Evaluation of CMB seminars given by students
- Service on standing CMB committees
- Participation in annual CMB retreat
- Service on studies/thesis committees

- Participation in student rotations
- Organizing seminars/hosting speakers
- Assistance in recruiting or interviewing incoming students
- Teaching within CMB core courses or required electives, or other courses for graduate credit that are recognized by the Program

In addition, the review process will evaluate completion of rotation evaluations, where appropriate, or other important duties in CMB student education. The Faculty Membership Committee Chair follows through with reminders to the CMB faculty regarding renewal.

Committee members vote on each application for renewal of membership. If the renewal application is successful, membership is renewed for 3 years and a report is made to the Steering Committee. If the renewal application is not successful, the vote is reported to the Steering Committee with an explanation of the Committee's concerns. The Steering Committee may decline to renew a faculty's membership or provide a friendly reminder of the ways to participate in the Program and ask that the faculty member request renewal again after one year. If at that time participation is not improved, the Steering Committee may choose to decline the renewal application.

## **APPENDIX**

### **COMPREHENSIVE EXAMINATION**

#### **The CMB Phase I Comprehensive Examination:**

An oral examination to be completed by June 30<sup>th</sup> of the first year.

#### **Phase I Method:**

All students will take the exam on the same day during one of three 1.5 hour time slots. Students should refrain from discussion of their exam with students who have not yet completed theirs. Based on any topic from the first year curriculum, CMB seminar, or of importance to CMB in general, students will be asked questions intended to assess their knowledge and ability to integrate facts into broader concepts and applicable approaches.

**Phase I Philosophy and Expectations:** Phase I is organized to assess the ability of students to think as scientists in terms of hypothesis generation and logic and to link these skills to a general understanding of how we gather the information and how these pursuits are linked in the big picture.

The goal in this assessment is to establish that the student is sufficiently equipped with fundamental knowledge and the capacity to integrate and apply that knowledge in a scientific manner to merit continuation in the PhD program. This goal is to both protect unprepared students from spending unproductive time in graduate school and to protect the program and its faculty from expending effort on students unlikely to graduate. With this in mind, the Phase I represents a means to rigorously and fairly evaluate what is considered an acceptable doctoral candidate at the end of their first year in the CMB Program, and students should base their preparation time accordingly.

### **Phase I Roles:**

**Student:** The student should be prepared to answer questions ranging from general big-picture to moderately specific (for example, students may be asked whether a specific protein is basic or acidic, but should not be expected to have memorized its pI; or to explain the general steps of how to isolate an organelle, but not actual spin speeds and buffer components required, etc.). Students should use the grading rubric to decide how to most effectively allocate preparation time. As science is a collaborative effort, discussions with classmates and mentors is allowed. Practice defenses are fine as long as CMB faculty do not participate.

**CMB Phase I Qualifying Exam Evaluation Committee:** The multiple Phase I Committees will consist of three CMB faculty, including at least one member of the CMB Education Committee. Other faculty will be chosen based on availability, but will not include any rotation advisor for a given student.

### **Phase I Decision:**

The Education Committee will notify the students of their results by the end of the exam day. If the student does not pass on the first attempt, the student will be provided a timeline and format for a single retake.

### **The CMB Phase II Comprehensive Examination:**

A written examination to be completed by Aug 31<sup>st</sup> of the second year.

**Phase II Method:** Phase II is organized to assess a student's ability to write a grant proposal using the NIH R01 guidelines and to have the opportunity to answer follow-up questions and to demonstrate general subject knowledge in front of the Evaluation Committee. The Evaluation Committee will be provided 2 weeks to review the written document, after which time the Evaluation Committee will meet with the student to evaluate the quality of the document and to ask questions.

**Phase II Philosophy and Expectations:** Writing is often the best way to learn to formulate testable hypothesis(es) and plan a reasoned set of experiments designed to explicitly test the hypothesis(es). This part of the Comprehensive Exam is designed to evaluate the students' written scientific communication ability as a measure of appropriate progress towards a doctoral degree **as a second year student**. This should not be viewed from the aspect of 'fundability' but rather scientific quality and student potential. The Committee should focus their evaluation on the breadth and depth with which the topic/problem is communicated, clarity of approach, and the logical underpinnings of the science.

The student should follow the R01 general guidelines (1+12 page with 'Specific Aims, Significance, Innovation, Approach' format, although all 12 pages may not be required); however, the student should

focus their language (significance & innovation particularly) to the Federal agency that best suits the science (i.e. NSF, NIH, USDA, DOD, etc). While a desired side-product of this written work is to turn them into pre-doctoral Fellowship applications, the in-depth, high-level grantsmanship should be withheld until after the completion of Phase II, when it becomes the purview of the student's advisor and Thesis Committee.

**Phase II Topic:** The Phase II written exam should be based on the student's actual thesis topic or a potential thesis topic. The students will have been in the thesis lab for approximately one year when defending this proposal and obviously may not have discovered the topic upon which their final dissertation will be based.

**Phase II Roles:**

**Student:** Discuss with the thesis advisor likely dissertation research and choose two avenues/aims that you are or possibly will be pursuing. **On your own:** develop a "stretch" third aim that will inform the creation of an overarching hypothesis for the whole proposal; alternatively construct a hypothesis and then design an appropriate stretch aim.

**Advisor:** Discuss with your student likely dissertation research that will constitute two skeletal aims that are, or could be, part of the student's thesis. Do not provide specifics for generation of the hypothesis or construction of the third aim, but do assure that the stretch aim is sufficiently distinct from work that has or is being conducted by the lab, has been or is being conducted by collaborators, or is part of a grant proposal that has been written but on which work has not yet commenced. Help the student to formulate an appropriate Thesis Committee, which will serve as the bulk of the Evaluation Committee.

**CMB Comprehensive Exam Evaluation Committee:** Members of the Evaluation Committee will consist to the student's Thesis Committee, his or her research advisor, and a member of the CMB Education Committee. The Evaluation Committee will review a written outline in the form of a Specific Aims page or Project Summary (in NIH lingo) and approve the topic, hypothesis, and aims, which will allow the student to work on the proposal during the Grant Writing Course. It is possible that the aims/hypothesis will be modified during this course or afterwards, which is fine provided that the "stretch" third aim remains distinct from the work routinely conducted in the advisor's laboratory or in collaboration.

**1. CMB Education Committee Member:** Selected by the student. Present to normalize rigor of the Exam portion, to provide an outside view towards the topic of the proposal and defense, and to assure that (i) the examination does not become an evaluation of the Advisor's research, nor that (ii) the Advisor provides excessive assistance to, or critique of, the student. If the Education Committee member is also a member of the Thesis Committee, they may serve both roles simultaneously. However, the Education Committee member cannot concurrently be the advisor.

**2. Thesis Committee Members:** To provide basic knowledge of the thesis topic.

**3. Research Advisor:** To provide evaluation of the student's independent thinking and integration with the work previously conducted by the laboratory.

Others: The student may seek advice from other students, postdocs, and technicians as they see fit. CMB faculty should refrain from specific assistance, particularly with hypothesis formulation and testing within the stretch aim, although general questions about the faculty's area of specialty are acceptable.

**Phase II Discussion:** The student will meet with the Exam Evaluation Committee after submitting the written document. This meeting is not intended to be a full defense or an oral presentation. The purpose is solely to ask clarifying or exploratory questions of the student to gauge their familiarity of the document. There will be no slide presentation other than data figures from the document. This part of the Comprehensive Exam is envisioned more as a discussion of the science and a clarification of the written proposal. The role of the Education Committee member is to assess the rigor of the evaluation for normalization across the program and to keep the student's advisor from answering questions directed at the student or asking either leading or adversarial questions.

After the Education Committee member, upon polling the other faculty, is satisfied with the thoroughness of the discussion, the student will step out of the room and the Education Committee member will extract a consensus. The total duration of the student's discussion of the proposal will likely range between 30 and 90 minutes. After the Education Committee member is satisfied as to the rigor of the assessment, a standard Thesis Committee meeting may continue.

**Phase II Decision:** Well before the August 31<sup>st</sup> deadline, the student should have completed the proposal and submitted the document to the Exam Evaluation Committee. The Exam Evaluation Committee will then judge at the meeting with the student whether the written proposal (and answers to follow-up questions, if any) provides evidence of the student's qualifications for admittance to doctoral candidacy. If the student does not pass on the first attempt, recommendations for improving the written document will be provided in written form by the Exam Evaluation Committee to the student and the CMB Program office. A revised proposal must then be submitted and evaluated before the August 31<sup>st</sup> deadline.

#### SAMPLE STUDENT SCHEDULE

<u>Year 1</u>		
<u>Fall</u>	<u>Spring</u>	<u>Summer</u>
BIOC 301 (3 cr)	BIOC 302 (3 cr)	CLBI 491 (5 cr)
Genetics (3 cr)*	CLBI 301 (3 cr)	Phase I Comprehensive Exam by June 30th
CLBI 491	CLBI 401 (2 cr)	Choose Advisor
Teaching Assignment (I)	CLBI 491 (1 cr)	
<u>Year 2</u>		
<u>Fall</u>	<u>Spring</u>	<u>Summer</u>
CLBI 402 (2 cr)	Grant Writing (2 cr)	CLBI 491 (5 cr)
Ethics (1 cr)	CLBI 394 (3 cr)	Phase II Comprehensive Exam by August 31
Elective	Elective	

CLBI 491	CLBI 491	
Teaching Assignment (II)		
<b><u>Year 3</u></b>		
<b><u>Fall</u></b>	<b><u>Spring</u></b>	<b><u>Summer</u></b>
Elective	Elective	CLBI 491 (5 cr)
CLBI 491	CLBI 491	
<b><u>Year 4</u></b>		
<b><u>Fall</u></b>	<b><u>Spring</u></b>	<b><u>Summer</u></b>
CLBI 491 (6 cr)	GRAD 903 (9 cr)	GRAD 902 (5 cr)
GRAD 901 (3 cr)		
<b><u>Year 5 &amp; Beyond</u></b>		
<b><u>Fall</u></b>	<b><u>Spring</u></b>	<b><u>Summer</u></b>
GRAD 903 (9 cr)	GRAD 903 (9 cr)	GRAD 902 (5 cr)

\*Can be taken during a later semester

#### **SUPPORTING INFORMATION LINKS**

[\*\*BYLAWS\*\*](#)

[\*\*MEMORANDUM OF UNDERSTANDING\*\*](#)

[\*\*ADMINISTRATION LIST\*\*](#)

[\*\*FACULTY LIST\*\*](#)

[\*\*STUDENT LIST\*\*](#)

[\*\*ROTATION AGREEMENT FORM\*\*](#)

[\*\*ROTATION EVALUATION FORM\*\*](#)

[\*\*ANNUAL PROGRESS REPORT FORM \(FOR STUDENTS WHO STARTED PRIOR TO FALL 2017\)\*\*](#)

[\*\*ANNUAL PROGRESS REPORT FORM \(FOR STUDENTS WHO STARTED FALL 2017 OR LATER\)\*\*](#)

#### **GRADUATE COLLEGE FACULTY & STAFF RESOURCES**

#### ***GRADUATE COLLEGE FORMS/POLICIES/PROCEDURES***

1. [Requirements for the Doctorate in Philosophy Degree](#)
2. [Funding Your Graduate Education](#)
3. [Graduate College Academic and Enrollment Policies](#)

4. [Rights and Responsibilities of Graduate Students](#)
5. [Leaves of Absence](#)
6. [Graduate Faculty Information & Forms](#)