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MGM Graduate Student Handbook

Duke University
Credited from the UPGG Graduate Student Handbook
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MGM LEADERSHIP

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FIRST YEAR IN THE MGM PROGRAM

Welcome to MGM! Your first year will give you the best opportunity to: 1) sample the diversity of laboratories in which you can ultimately pursue your dissertation research; and (2) build the course training that you need to become knowledgeable in Molecular Genetics and Microbiology.

RESPONSIBLE CONDUCT OF RESEARCH: All Years in Program

ALL matriculating PhD students at Duke University are required to complete a total of 18 hours in RCR orientation. This reflects our expectation that every doctoral candidate will be well qualified to address the growing ethical challenges that arise when teaching or conducting research. Academic integrity and research ethics are fundamental to the practice of science. Duke created a rigorous program to train students in the highest standards for conducting research. All biomedical PhD students are required to participate in in-person and online RCR courses for a total of **18 contact hours**

	Year 1	Year 2	Year 3	Year 4	Year 5+
Fall	BIOTRAIN 750 (Orientation/RCR Intro)	1 DOSI-Asist Elective fall/spring	1 DOSI-Asist Elective fall/spring		2 RCR Forum Electives fall/spring
Spring	BIOTRAIN 751			BIOTRAIN 754	

Fall Semester: Introduction to RCR Concepts (BIOTRAIN 750): This one-day on-site event held in the Trent Semans Center Great Hall is required for all entering 1st year Biomedical PhD students during orientation prior to the start of classes in August. Topics of the interactive presentations include: Expectations of a graduate student, Concepts in professionalism, Best practices for choosing a rotation and thesis mentor, Self-awareness and wellness, History of ethics and inherent bias, Data documentation and electronic lab notebooks, Understanding and reporting professional misconduct, and diversity, inclusion, and cultural awareness. Presenters include the Associate Dean for Research training, faculty and students from SoM graduate training programs and departments, the student ombuds, and the Assistant Dean for Graduate and Postdoctoral Diversity and Inclusion. **total RCR credit: 4 hours**

Spring Semester: The Responsible Scientist I (BIOTRAIN 751): This course offered in the Spring semester, and required for all 1st year students (Fall '20 matriculants or later), utilizes online lectures/modules, in-person lectures and small group discussions, and focuses on RCR and R&R topics for early-stage graduate students. Topics of this course include: understanding your research area, developing a research hypothesis, and designing your research study, as well as research misconduct, mentorship, conflict of interest, policies surrounding the use of human and animal subjects, and data acquisition and laboratory tools. Each topic is accompanied by a short assessment to evaluate learning mastery. Bi-monthly small group sessions centered on expanding the online/lecture material through discussion questions and case studies build community and encourage continual embedded dialogue about best practices in RCR and R&R. Small groups are led by training faculty representing each of the PhD training programs and departments, with teaching assistance from senior graduate students and postdoctoral fellows. **total RCR and R&R credit: 4 hours**

Online modules/self-paced mastery of RCR and R&R: DOSI-ASIST offers a selection of vetted RCR and R&R training modules through the Duke Learning Management System (DLMS). In Years 2 and 3, students are required to annually take one 60-minute online interactive module from a menu of topics, including laboratory notebook tools, execution, management, and documentation of experiments, as well as communication of research. Each module is accompanied by an assessment. **1 hour credit per module (total RCR and R&R credit: 2 hours)**

Spring Semester: The Responsible Scientist II (BIOTRAIN 754): This course offered in the Spring semester, and required for all 4th year students, utilizes online lectures/modules, in-person lectures, and small group discussions, and focuses on RCR and R&R topics for advanced graduate students. Topics of this course include: data provenance and recordkeeping, data/resource ownership and sharing, research misconduct, mentorship, responsible authorship, publication, and peer review. Each topic is accompanied by a short assessment to evaluate learning mastery. Monthly small group sessions centered on expanding the online/lecture material through discussion questions and case studies build community and encourage continual embedded dialogue about best practices in RCR and R&R. Small groups are led by training faculty representing each of the PhD training programs and departments. **total RCR and R&R credit: 4 hours**

Two 2-hr RCR Forums: In Years 5+, students are required to participate in two RCR Forums. If a student graduates in Year 5, two forums must be taken in one year. A student planning to graduate in Year 6 may take one forum in Year 5 and the other in Year 6. Each forum is a 1 hr lecture followed by a 1-1.5 hr small group discussion on a variety of topics. Forums are held on campus and are open to all graduate students at Duke, including those from the humanities and social sciences. The topics for the RCR Forums vary and serve as "electives" in RCR training. Topics include copyright vs plagiarism, global bioethics, academic freedom and civil discourse, intellectual property, and communication. Because students from the humanities and social sciences participate in forums, these events provide a broader view of RCR than presented in the 1st - 4th year RCR courses. **2 hour credit/forum (total RCR and R&R credit: 4 hours)**

The Responsible Scientist Teaching Assistant: Students in Years 4+ may earn RCR/R&R credit replacing one RCR forum by serving as teaching assistants in BIOTRAIN 751. Participation includes distribution of questions/case studies prior to small group meetings and facilitating discussion with the faculty small group leader. **total RCR and R&R credit: 2 hours**

OBGE Peer Mentorship Program. Students who are post-prelim may apply to be part of OBGE's Peer Mentorship Program. Students serve as mentors for first-year School of Medicine graduate students to guide them through the first year of graduate school and help them build connections among their peers. **1 credit for BIOTRAIN and historically a $1000 supplement.**

<u>COURSEWORK IN THE FIRST YEAR:</u>

Most major coursework requirements are pursued and satisfied in Years 1 and 2, except as specified. All MGM students (except for MSTP students, who have different requirements) must take and pass the following:

1. UPGEN 778A-F and CMB710A-F: *Genetic and Genomic Approaches to the Solution of Biological Problems/Cell and Molecular Biology Modules* (fall semester in year 1 & 2)
This modular course is required in Years 1 and 2 so that 12 modules in total are taken. Six modules are taken per year. At least 6 of the total 12 modules must be from the UPGEN offerings. The other modules may be taken from the CMB module course offerings to complete the course requirement.

- Students historically take somewhere between 8-10 modules in Year 1 and 2-4 modules in Year 2

2. MGM 701: *Foundations in Molecular Genetics and Microbiology* (required in Year 1). Students will discuss a book relevant to genetics and microbiology (currently *The Gene*) as well as present on selected canonical papers related to Molecular Genetics and Microbiology with input and context from MGM faculty.

3. MGM 790s: *Friday student research seminar* (required in years 1-3). You will not be required to give a presentation in this course during your first year but will listen to more senior MGM students and provide critiques on their presentations. Later in your graduate career, you will also give presentations. Each student is expected to present once while enrolled in the class (Year 2 or 3) and once as a senior graduate student (usually years 4 or 5), when no longer formally enrolled in the class.

4. MGM 793: *Research in MGM* (required for Years 1 & 2). Fulfilled through rotations in Year 1 and through research in your thesis lab in Year 2.

5. Scientific Writing (Fall, year 2)

6. Electives: One course is required from the core electives (Human genetics, virology, and microbial pathogenesis), and an additional two electives are required to complete MGM's curriculum requirement. Each year the Director of Graduate Studies, Director and administrator will help to determine which courses may be used to fulfill this requirement. The list of electives is updated every semester on the OBGE Website:

(https://medschool.duke.edu/education/biomedical-phd-programs/office-biomedical-graduate-education/student-resources/basic)

**By the end of the second year, all MGM students should have a minimum of 24 graded credits. They must earn a B- or higher to receive course credit and must maintain an average 3.0 (B) GPA.*

Other Required Academic Activities

All students are expected to attend the monthly MGM research meetings (generally the second Monday of each month) and at least one extramural seminar per week. MGM-sponsored seminars include the Tuesday Seminar Series (joint with UPGG) and Thursday seminar series (co-sponsored with Cell Biology and CMB). Students are encouraged to take advantage of the sponsored student lunches with the invited speaker.

REGISTRATION:

All first-year students will meet with a faculty advisory committee including the DGS and Program Coordinator/DGSA prior to the beginning of classes in the first year. You should plan to meet again with a faculty advisory committee, or the DGS and Program Coordinator/DGSA near the end of the first semester to choose your spring semester courses.

To register for courses: You will be automatically registered for "Full Continuation" (CTN) for the fall and spring semesters, but *it is important that you verify this process has actually happened*. If you do not see "CTN" on your fall and spring list of courses, please contact the DGS/DGSA immediately. *If you do not register before the end of the add/drop period, you will be unable to fulfill your requirements*. **EVERY SEMESTER**, registration for Continuation (CTN) will be required, ***including manual registration for Full Continuation (CTN) in summer.***

RECRUITMENT:

First year students are important contributors to recruitment of new students. All first years are expected to participate in recruitment weekends held in the Spring semester. This involves working with the student recruitment committee and the admissions committee to plan recruitment activities, and later acting as host for a recruit.

LABORATORY ROTATIONS IN THE FIRST YEAR:

Purpose of rotations: It is important to take full advantage of these laboratory rotations. They fulfill several purposes by providing: 1) exposure to different types of research and scientific approaches; 2) practical experience that will help in deciding the laboratory in which you will want to pursue your PhD; and 3) provide the lab members and PI with an opportunity to consider a potential 4 to 5-year working relationship.

Choosing rotation labs: Students must perform *at least* **three** different laboratory rotations during the first year, each **8 weeks in duration**. The dates of the rotations are typically aligned with the dates set by the Office of Biomedical Graduate Education. Rotations with faculty members of MGM are strongly encouraged. Students are encouraged to explore areas of research within MGM that they may not have considered prior to entering the program. Your classes during the first semester provide an important opportunity to meet different professors and to learn about research topics that might not be on your immediate radar screen. There are over 65 MGM faculty representing a broad spectrum of rotation experiences. For this reason, rotations outside of MGM are discouraged. However, if you wish to rotate with a non-MGM member, prior approval from the DGS is required and it is unlikely that you will be able to join that lab as a thesis lab.

Rotation report: At the end of each laboratory rotation, you and your rotation mentor must submit a rotation evaluation form in T3, documenting the lab in which you performed your rotation and a description of the work you pursued and completed while there. **A Rotation Evaluation Form must be completed by you and the rotation mentor within 2 weeks after completion of each rotation. It is important for students to carefully read the evaluations they receive in T3 for the rotations, as this will provide important feedback for students' continued development. It may also give some sense of the likelihood of being offered a spot in the lab. Remember that for "popular" labs with multiple rotation students, the likelihood of getting an offer to join may not be high.**

THESIS ADVISOR:

Students affiliate with a thesis advisor after doing three or more rotations. This is usually by May of year one and the standard number of rotations is 4, although, with the approval of the DGS, a student may join a lab after 3 (although in many cases that is not possible, because other students are rotating in the fourth rotation slot). Students are welcome and encouraged to discuss affiliation choice with the MGM leadership. In some cases, a student will do 4 or more rotations before choosing an advisor. All students are expected to have affiliated with a thesis advisor after four rotations or, if they have not found a position in a lab at that point, by August of the first year.

Please refer to the website for the required paperwork. ***The selection of a lab for one's PhD research must be discussed with the potential PI/faculty advisor and approved by the Chair and Business Manager of the department to which the PI belongs. Before you formally can affiliate, you and your potential advisor will need to submit the Affiliation Form and Backstop Agreement, signed by the Chair of the primary department to which your Advisor belongs.***

VACATION POLICY:

At minimum, students can take 2 weeks' worth of vacation time a year. Regardless of student status (rotation or affiliated) in a lab, the student should request and confirm approval with the advisor when they take vacation. There may be exceptions to the two weeks, but that is at the discretion of the advisor. Any extended period of time away from the program (more than 4 consecutive weeks) needs to be discussed with the DGS and may necessitate a formal leave of absence.

Please see the Duke Graduate School website for more details:

https://gradschool.duke.edu/policies-forms/duke-graduate-school-student-time-policy/

CONFERENCE TRAVEL AWARDS:

Students in their first and second year of training who are presenting a paper or poster at a conference may request a travel award from the Graduate School. Students are limited to one stipend per fiscal year (July 1 – June 30). Students must have passed their preliminary exam and bein good standing with the graduate school and the program in order to be considered for this travel stipend. ***Please note-Students on academic probation are not eligible for this award.*** To apply for an award, please use the Graduate School forms to supply the program coordinator/DGSA with the following information:

1. The name of the meeting and other relevant details (conference dates, location, etc.)
2. A copy of the submitted abstract.
3. Documentation of approval for presentation of paper or poster at the conference
4. A letter of support from your faculty advisor in whose laboratory or group the accepted work was carried out.

SUMMER: Be sure to register for full continuation (CTN) over the summer.

SECOND YEAR IN THE MGM PROGRAM

During the 2nd year (third and fourth semesters at Duke), MGM graduate students complete the remaining course requirements. The highlights for this year include:

- Selection of advisor
- Selection of preliminary exam/thesis committee members
- Preliminary Examination taken between the start of the 4th semester (SPRING, 2nd year) and before the end of the 5th semester (FALL, 3rd year)

COURSEWORK:

By the end of the 2nd year, every MGM student should have a minimum of 24 graded credits and 30 total credits. In addition to CTN, second-year students are required to register and enroll in:

- **UPGEN 778A-F and CMB710A-F**: *Genetic and Genomic Approaches to the Solution of Biological Problems* / *Cell and Molecular Biology Modules* (fall semester, 3-6 modules). You should have taken a combined total of 12 modules by the end of the fall of year two.
- **BIOTRAIN 720:** Writing Grant Proposals (full semester, fall of year 2)
- **MGM 790s:** Friday student research seminar. You will be required to give a presentation during year 2 or Year 3
- **MGM 793:** Research in MGM
- **Elective:** Any elective you choose that is part of the biomedical graduate program offerings. The elective offerings will differ from semester to semester and year to year.

RESEARCH:

It is expected that all second-year PhD students will establish and pursue dissertation-related research in their selected laboratories. This research should be both novel and at least somewhat independent. If you have concerns about your chosen lab, first talk with your advisor. If you are unable to resolve the concerns, then see the DGS.

FINANCES:

For guidance regarding your financial package, including tax guidance, please see: https://gradschool.duke.edu/financial-support/financial-policies-forms-and-resources

PRELIMINARY EXAM:

Choosing the Committee: Second year students must select a preliminary exam/thesis committee. MGM preliminary exam committees are composed of five faculty members, including your advisor. At least three of the committee members must be MGM faculty. The Chair must be a MGM faculty, but cannot be your advisor. The selection of the "minor area" member merely represents the faculty member whose research expertise overlaps the least with the prelim/thesis project area. Please note that the minor area faculty cannot also be the chair of the committee. Students may wish to include one committee member who is not already on Duke's Graduate Faculty (a full list of graduate faculty is available on the Graduate school website). In such cases, with the approval of the DGS, the DGS may nominate them to be "term faculty." This will require a nomination to the Graduate School which will generally require a CV and other materials, but is relatively easy.

Please note that any committee changes must be approved by the Graduate School, and must also be approved for 30 days prior to the preliminary exam or dissertation defense. Committee change forms are submitted through the administrative coordinator.

MGM requires that students take preliminary exams **during the second semester of the 2nd year and no later than the end of the first semester of the 3rd year**. Exceptions should be justified by the student in writing and will require approval by the DGS and the Graduate School.

Timing of Prelim: The **preliminary exam** should be taken between the start of the fourth semester (spring of the 2nd year) and no later than end of the fifth semester (fall of the 3rd year) in graduate school. The exam must be registered in the T3 system (the student should work with the program DGSA to ensure this). It is important then to have one's committee selected by December of the 2nd year (third semester) and one's prelim date scheduled for some time in the fourth or fifth semester. The preliminary exam consists of a specifically focused written proposal and a general oral exam. Extensive amounts of preliminary data are NOT required.

Purpose of Prelim: The prelim is an important measure of a student's ability to think logically and to exhibit their knowledge gained from coursework and rotations in the 1st and 2nd years. T3 shows the specific categories on which the student is evaluated. The examination committee will determine if the student is adequately prepared to advance to PhD candidacy and to embark on novel research under the guidance of the advisor/mentor. *If a student has generated preliminary data from their thesis project at this point, it is considered a bonus, but not an absolute requirement.* During the prelim, the student will be tested on the ability to think clearly and logically, to articulate knowledge of genetics and genomics in a professional and coherent manner, and to present reasonable ways of approaching and investigating various scientific problems and concepts, both in a written and oral context. Evaluation and a rubric are shown in the Resources section of T3.

Committee Approval Prior to Exam: The Graduate School requires that the Committee Approval form be submitted and approved at least **one month** before the scheduled preliminary exam. Please keep in mind that this process is not instantaneous, so it is important to email your committee composition to the program coordinator at least **two** months before the preliminary exam. The DGS must be notified if a student is unable to meet the deadline. The DGS will approve the electronic form and submit it to the Graduate School. Preliminary exams ideally occur in person, but if needed, can be conducted virtually. This must be indicated in the T3 milestone entry.

The Graduate School has declared that there will be no exceptions to this rule, and preliminary examinations held in violation of this policy will be declared invalid and need to be repeated.

WRITTEN DOCUMENT:

Students are encouraged to begin writing after formation of the committee, as the proposal should be written while simultaneously being productive in the lab. Part of the learning process is determining how to balance writing while also working at the bench. This often requires working on the document in the evenings and on weekends. Suspending lab work for several weeks to months in order to write one's prelim document is discouraged.

The written proposal focused on the topic of the student's thesis research should be handed out to the thesis committee two weeks before the oral exam date. Committee members often serve on up to 25 different prelim and thesis committees, so remember to be courteous and submit the document to T3 **at least 2 weeks before the exam date**.

CONTENT OF PROPOSAL: The written proposal could be in the format of an R01 or NRSA-like NIH grant (10-12 pages long, single spaced, excluding Literature Cited). As is typical in a research grant proposal, the major content areas could include Specific Aims, Approach (including Significance and Innovation), Research Design and Methods (including Preliminary Data), timeline, and Literature Cited. The purpose of utilizing this format is to give students an opportunity to organize their thoughts in a manner that will have practical ramifications for them throughout their career; specifically, the students will gain experience in the logical, written presentation of their work. Thus, writing style, i.e. the clear and orderly presentation of material as well as adherence to acceptable standards of written English, is a key component of the proposal. All MGM students are required to take BIOTRAIN 720 (Grant Writing) to gain experience in writing an NIH-style proposal. The written proposal will be the student's own work within the framework of the existing broader project in the PI's lab, but it will no doubt reflect discussion and planning between the student and his or her thesis advisor.

Preliminary Exam:

The oral portion of the preliminary exam will consist of a presentation (should aim for ~30 minutes) by the student, general questions, usually arising from but not limited to the material on the written proposal, and in-depth discussion with the student on the research proposal. The Chair of the committee will be assigned by the DGS based on familiarity with MGM preliminary exams and knowledge of the area of research.

CHAIR OF THE COMMITTEE: The thesis advisor will be present as an observer but does not serve as chair or participate in the questions. The thesis advisor will participate in the deliberations regarding the committee's evaluation and recommendations and will also participate in the vote in T3 to determine the decision.

WHAT TO EXPECT AT THE EXAM: Preliminary exam oral sections typically take at least 2 hours. It is recommended that the student book a 2.5 hour time slot. The format of the oral portion is at the discretion of the advisor and committee members. A typical format starts with the student leaving the room for 5-10 minutes while the committee discusses their progress in graduate school and any concerns. Following this, there will be a presentation by the student of the proposed research. The committee will then ask questions both related to the

proposed work and questions of which you should be knowledgeable as a scholar in your chosen field of study. The preliminary exam is an important measure of a student's ability to think logically and to exhibit knowledge gained from coursework and rotations in the 1st and 2nd years. Its ultimate purpose is to define the limits of understanding of the student, so do not panic if you do not know the answers to some of the questions asked. While sometimes perceived as stressful, these exams are intended to be constructive, in that areas of strength are highlighted, and areas of weakness are identified so that they can be remedied. The examination committee will determine if the student is adequately prepared to advance to PhD candidacy and to embark on novel research under the guidance of the advisor/mentor. The student should expect to leave the room at both the beginning and end of the exam.

WHAT TO EXPECT AFTER THE EXAM: After the exam, each committee member will evaluate the student in the T3 system with respect to several important concepts and skills. The student will be able to view the average scores from the committee and identify areas of both strengths and weaknesses. **Students need to score an average of 3.0 across the categories shown in the T3 rubric to pass the preliminary exam.**

At the end of the prelim, the committee will complete the official assessment/progress form in T3 to offer feedback on the student's written and oral abilities and aims and scope of the proposed research. Similarly, at subsequent committee meetings, the committee will also provide feedback via T3. Feedback should be completed in T3 before the meeting concludes. The student and advisor should meet privately to discuss the comments from the committee and determine an action plan for the coming year. The student should make sure to read the comments available in T3.

GRADUATE SCHOOL FELLOWSHIPS AND AWARDS:

The graduate school offers many fellowship and awards to continuing graduate students. Use the link to find details on funding opportunities. Please follow the application directions found on the website. https://gradschool.duke.edu/financial-support/find-funding

****Pay careful attention to the application requirements****

1. Some of these awards require a letter or approval by the DGS. Thus, all students who would like to apply to a particular award must request that they be nominated or have a letter of support no less than 1 week prior to the deadline for the particular fellowship.

2. In some cases, the program is limited to the number of individuals that we can nominate for a particular award. In those instances, the priority will be given to the student who has requested to be nominated first, as long as that student meets the eligibility criteria.

Feel free to contact the program DGS or coordinator with any questions about the fellowships.

SUMMER:

Be sure to register for full continuation (CTN) over the summer if in the MGM Track.

THIRD AND SUCCESSIVE YEARS IN THE MGM PROGRAM

Graduate students who enrolled through the MGM program will focus on pursuing research in the third and succeeding years. *All students must complete the preliminary examination by the end of the fifth semester* (FALL OF THE THIRD YEAR).

- **RCR REQUIREMENT**: Remember to register for and complete the mandatory 3rd year RCR training (BIOTRAIN 753-online)

- **COURSES**: Third year students are still required to register for MGM 790s (the Friday student research seminar). After the third year, students are still expected to attend and participate in seminars and departmental works in progress regularly. All students must continue to register for CTN.

- **FINANCES:** When starting your second year (September), you will change from "non-comp" payroll to compensatory payroll, unless you have an outside fellowship or are on a training grant. A letter will be sent to you, your advisor and your departmental payroll representative. Please contact your departmental business manager to discuss and learn about your payroll status. You are free to consult with the MGM Program Coordinator to verify that you are being paid properly.

  RESEARCH: After passing the prelim, the student's priority is performing high-quality research and being productive at the lab bench. Becoming an excellent scientist requires focus, motivation, determination and resilience, but most of all, it requires time and commitment to the lab and the research project. Labs usually are funded by multiple agencies or funding sources that demand accountability for the money given to support salaries, stipends, and research activities. This accountability extends from the P.I. to *every member of the lab, including students*. Thus, MGM students are expected to be productive and to contribute scientifically to their lab group and more broadly to the respective research areas/fields. Expectations of the advisor should be discussed regularly so that the student is aware whether they are meeting expectations. This can also be delineated in the student-mentor compact (see the section on annual committee meetings).

- **CONFERENCE TRAVEL AWARDS**: Any graduate student enrolled in a Ph.D. granting program who has passed all parts of the preliminary exams and is actively participating in a conference (i.e., presenting a paper or poster, or leading a discussion) is eligible for the grad school conference travel award. Students are limited to one conference travel fellowship per fiscal year (July 1-June 30). Students attending conferences during the academic year must be registered at the time of the conference. For summer conferences, students must be registered for the upcoming fall semester and also must have been registered for the previous spring semester. No exceptions will be made. *Terms of the Graduate School Award*: The Graduate School will provide 70% of the cost of registration fees, primary travel, three nights lodging, and meals for four days (up to $25 a day); the maximum amount to be paid by the Graduate School is $500. The student's primary department will contribute 30% or a maximum of $300 toward the award. All remaining expenses will be self-pay or PI funded https://gradschool.duke.edu/sites/default/files/documents/conftrav.pdf **All conference travel applications must be signed and submitted through the student's primary department. Please contact the MGM program coordinator with any questions.**

- **WORKING IN THE LAB AND BEING A GOOD CITIZEN**: When joining a lab, the student is now a vital part of the lab mission and operation. Each student should make a concerted effort to become integrated into the lab workings and to contribute positively to the lab productivity and daily procedures. Students who simply "occupy" a lab – those who give little thought or interest to those around them, and from the lab experience diminish opportunities to grow and mature as a scientist and eventual group leader. Students are encouraged to purposely look for and undertake actions/activities that will benefit the lab operations and establish the student as an exemplary lab citizen. Remember, postdoctoral mentors are quite interested in the lab behaviors exhibited by potential candidates, and these qualities are often included in letters of reference written by PhD mentors.

  TEACHING/TA OPPORTUNITIES: TA experience is intended to be a quality educational experience in which the student does actual teaching in addition to other course-related activities, such as creating and/or grading homework, problem sets, exams, or other written assignments. At the end of the TA, the student should submit a one-page (minimum) written summary of her/his activities during the course. For those students who are interested in gaining additional teaching experience beyond the TA, there are a number of teaching options available. Naturally, these experiences require more time and effort and should not detract from the student's research time. **Students are encouraged to discuss teaching objectives with their mentor/advisor and to design a mutually acceptable plan to incorporate training in teaching while simultaneously maintaining high research standards and productivity. Be aware that teaching hours during the workday will likely necessitate extra hours in the laboratory at night or on weekends.** Duke University offers more formal training that goes beyond the typical TA experience of grading exams and holding review sessions. In addition, a more involved TA experience is possible in a number of undergraduate introductory labs. Please contact individual instructors for more details about a TA-ship.

- **SUMMER INTERNSHIPS**: The MGM offers its students an array of internal and external educational experiences. These opportunities may include an externship with private industry partners that provide our student body with non-academic research experience. While these opportunities can provide valuable training for MGM students, they require some administrative consideration before they are undertaken, including:
  1. The student must first get approval from the advisor for the externship.
  2. The student must notify and provide details of the externship to their thesis committee.
  3. The student needs to provide the program (MGM) with a detailed summary of the externship, specifying how the experience will contribute to their area of research and further their PhD degree.
  4. Domestic students do not need to be registered for an externship course; **however** international students will need to take a summer externship class because of their visa conditions.
  5. If a student wants to continue working in their lab at Duke while working an externship, they must be registered for continuation and pay the tuition remission for that semester.
  6. Registered PhD students who continue to work in the lab during summer can work a maximum of **19.9 hours a week** in the externship.

*It's best to contact the program DGS **prior** to embarking on an externship opportunity.*

ONGOING REQUIREMENTS AND RESOURCES:

ANNUAL COMMITTEE MEETING:

Students are responsible for scheduling and holding yearly meetings (September-May) with their thesis committees. Failure to do so could put a student in jeopardy of making adequate progress to degree and will put a student on program probation. Please see the program coordinator if you have additional questions about the annual meeting requirement. Two to five days prior to the committee meeting, the student should send each committee member a one-to-three-page written summary/progress report that states: the Specific Aims of the project; any changes to the Aims from the previous Aims (as articulated at the prelim or a previous committee meeting); progress made under each aim; and the experimental plan for the coming year. Progress should not simply be a list of experiments that were done, but an interpretation of the data and what it means in the larger context of the project. In addition, all students should submit to the committee an updated CV that contains publications, presentations at meetings, and other appropriate accomplishments from the past year. All of these things should be provided in T3.

Students should also present their research progress via a PowerPoint presentation (15-20 minutes), leaving ample time for the committee to ask questions and offer suggestions for future work. Note, the PowerPoint presentation should not be done in lieu of a written document. Within one week after the meeting, a committee report/evaluation form should be submitted in T3. The student and advisor should meet privately to discuss comments from the committee and agree on an action plan for the coming year.

Students should register for each annual committee meeting in T3 (please work with the program DGSA). At each meeting, committee members will provide feedback through T3 for the student. Additionally, ahead of the committee meeting, MGM students are encouraged

to upload a completed annual mentor-mentee checklist found here: https://medschool.duke.edu/education/biomedical-phd-programs/university-program-genetics-and-genomics/academics/current-0
Please note that the mentor-mentee checklist requires a discussion with your mentor. If there are any items of concern for the student, in addition to submitting the form, the student is encouraged to reach out to the program DGS.

ADVISORY MEETING:

You are encouraged to meet with both the DGS and Program Coordinator informally at least once per year. This is a good way of getting an "outside perspective" on progress, programmatic issues, and getting some additional career advice. In addition, it allows program leadership to stay abreast of each student's progress and to offer help or advice as needed.

OTHER RESOURCES:

PREPARING FUTURE FACULTY: This is a part of a national initiative to help prepare students for an academic career. Students must apply to the program as only 25-30 fellows are accepted each year and preference is typically given to students who have already taken a teaching class. Requirements include mentorship, site visits, workshop attendance, self-evaluation, and teaching portfolio.

CERTIFICATE IN TEACHING BIOLOGY: This program is part of the Biology Department and has a goal of enhancing professional development for a variety of academic careers. Requirements include mentorship, coursework, practical teaching experience, teaching evaluation, and teaching portfolio.

TEACHING IDEAS WORKSHOPS: These workshops range in topics from active classroom learning to technology in the classroom. They are offered throughout the academic year and usually require advance registration. Pay close attention to emails throughout the year as the program administrator often sends out information about these opportunities.

COURSEWORK**:** There are numerous teaching courses available at Duke. Some are offered only in the spring or fall so plan accordingly.

CERTIFICATE IN COLLEGE TEACHING: This program requires coursework, teaching experience and observation, and an online teaching portfolio.

CENTER FOR SCIENCE EDUCATION: For those students who are interested in engaging the community in science education, the center provides resources and advice for designing and implementing outreach projects.

Duke Graduate School https://gradschool.duke.edu/professional-development/programs

PREPARING FOR THE FUTURE:

It is important to remember that your ultimate goals in graduate school are: 1) to complete an independent and significant body of research, 2) to become a knowledgeable scientist and lab citizen, and 3) to prepare yourself for the next steps in your career. While the first two points should be obvious, the third point is sometimes postponed inappropriately. You should constantly challenge yourself to think of what your desired next steps will be and how best to prepare for them well ahead of time. Defending one's thesis without knowing one's next step/position is an undesired outcome and is not reflective of the time and effort a student put in for 5 years or of the commitment and training contributed by MGM faculty and leadership.

For those who choose to follow an academic career path, you should present your research at national and international conferences, which presents an opportunity to meet scientists in your field(s) of interest. Beginning in the 4th year, students should take the initiative to identify and contact potential postdoctoral mentors. Setting one's future plan (postdoc, teaching, other career choice) should be done **one year** before the intended graduation time, hence allowing sufficient time to formulate and develop competitive postdoctoral fellowship proposals (e.g., NIH, NRSA). It is not unreasonable, and is in fact encouraged, to have a postdoctoral position /post-graduation employment lined up 6-9 months prior to graduation. You should talk OFTEN with your PhD advisor, committee members, and the DGS for guidance in both identifying potential postdoctoral opportunities and how best to take advantage of them. The 4th year committee meeting is an excellent time and setting to discuss future plans with 4-5 well-established scientists who all have gone through this process themselves. Some of these individuals may be willing to write letters of reference, so establishing a plan sooner rather than later demonstrates a student's longer-term vision (at least for the next 3-4 years).

If you are seeking a career in industry, you should also make many contacts and seriously consider how your research relates to the mission/aims of the industry you seek. Students may find the Duke Career Center https://studentaffairs.duke.edu/ to be a valuable resource for discussing and developing one's transition from graduate school to the workforce.

FINAL YEAR IN THE MGM PROGRAM

Most students complete and defend their thesis research between years 5 and 6. The expectation is that most MGM students will graduate in 5.5 years. The Graduate School rule is that the thesis defense occurs 2-4 years after the preliminary exam. Graduate credits have a time limit; those students still in the program 6 years past the date of the prelim are required to re-enroll in classes. http://gradschool.duke.edu/academics/degree_reqs/phd_reqs/index.php-time. This is a Graduate School requirement to which all training programs must adhere. The effective completion of one's PhD work is the oral defense and submission of final dissertation. There are several rules that must be followed well in advance of the defense date, as outlined below:

REQUIREMENTS TO GRADUATE WITH A PHD FROM MGM:

Credits: Completion of all the program curriculum requirements and the OBGE RCR requirements.

Final committee meeting: Generally, when the student and advisor believe that the student is ready to graduate, they should formally ask their thesis committee for permission to write their thesis and begin to set a date for a defense.

Publications: In order to graduate students must have a **minimum** of one 1st author manuscript (or co-first author) of **original and scholarly** work published (or *in press)* in a peer-reviewed journal. Review articles (even if peer-reviewed) do not count towards this requirement. *The manuscript must be officially accepted and/or in press before the committee can give a student permission to schedule the student thesis defense.* Knowing this requirement, students should aspire to publish before the 5th year and should discuss publications regularly with their advisors. Publications reflect your productivity and make you a strong candidate for the next step in your career.

In rare circumstances, prolonged manuscript review may potentially inhibit the progress of the student towards their degree. In such extraordinary circumstances, students can apply for an exemption to the publication requirement to their thesis committee.

The student should submit a letter to the chair of the thesis committee requesting a review of the submitted manuscript by the thesis committee. If the thesis committee agrees that the manuscript represents a publishable piece of work, and that the review process is impeding the students' progress towards a degree, then a brief statement from the committee chair describing the thesis committee's findings along with the student's description of the circumstances should be submitted to the Director of Graduate Studies. The MGM leadership team will review the documents and determine whether an exemption to the publication requirement is warranted.

Committee chair: Once you have completed the prelim, you should update your thesis committee form. The thesis advisor ***serves as*** chair of the final examination committee. At least two months before your final exam, double check that your PhD defense committee is up to date. This form (located on the MGM website under "Commonly Used Forms") is submitted by the Program Coordinator and DGS and approved by the Associate Dean of the Graduate School. As with the preliminary exam, please remember this is not an instantaneous process, so please submit this paperwork an additional month ahead of time.

Required Forms: MGM requires all students to complete the pre-defense checklist (located on the MGM website under "Commonly Used Forms"). The form must be signed by the committee chair and the student's advisor, then submitted to the program coordinator the **semester** prior to the defense. The "Intention to Receive Degree" form must be submitted to the Graduate School in January, for the May commencement, in July for September commencement, and in November for December commencement. However, these deadlines can change without warning, so please consult the Graduate School Bulletin. The necessary form is online (https://gradschool.duke.edu/academics/preparing-graduate). If you do not graduate at the anticipated time, there is no penalty. However, you must submit a new form for the next commencement date. This form is submitted via the web. ** Please, SEND A NOTE OR EMAIL to the MGM Program Coordinator indicating that you have submitted your commencement form. **

Scheduling the defense: If your faculty is affiliated with a different department, please contact the program office two months prior to your dissertation if you need help arranging a time and place for your defense. The MGM admin will help with the scheduling your defense and with distributing information about it to MGM students and faculty. Otherwise, please notify the MGM program office at least one month prior to your seminar so that we may confirm that all requirements have been met. ***At least two weeks before your defense***, you must 1) have your advisor initiate the milestone in T3, 2) confirm your title with DGSA, and 3) upload the electronic copy of your dissertation into T3 and ProQuest and 4) send a copy of the thesis to all committee members.

WRITTEN DOCUMENT/THESIS:

Students are required to give committee members a complete draft of the dissertation **two weeks ahead of the defense date**. This allows the committee members enough time to read the entire dissertation and to contact you with major changes to the document that can be addressed in a revised document before the defense. Ensure that the dissertation is submitted to the advisor and committee for comments, and then to both T3 and Pro Quest electronically before the defense. Some revisions may occur afterwards, but it will save you time if you have some of these changes in hand before the defense so that revisions can be easily attended to in the week between the defense and re-submission of the revised document. Bear in mind that proper planning can alleviate much of the stress that inevitably leads up to the thesis defense. Format of document: The Graduate School has a booklet called "Guide for the Preparation of Theses and Dissertations" https://gradschool.duke.edu/academics/theses-and- dissertations which sets forth requirements concerning the dissertation format (page layout, type style, footnotes, etc.), submitting the dissertation for preliminary approval, binding, copyright

procedures, etc. **In addition, MGM leadership has requirements and expectations for the content of the written thesis document. The general outline is as follows:

Chapter 1: Introduction. This should include background information that is relevant to the subsequent data chapters. In general, it should define the research area, the research problem, the gap in knowledge, and summarize the main points of the thesis.

Chapters 2+: Data. These chapters should describe the distinct studies that make up the body of thesis research. These chapters are often from published papers. While the published document can provide a framework for the chapter, the student should ensure that figures follow the formatting and numbering of the thesis. In addition, sufficient background, justification, and experimental detail that might not be included in a published paper should be included in the thesis chapter(s) so that committee members can thoroughly evaluate the work.

The title pages of the chapters that are linked to published papers should indicate the publication somewhere on the page. Doing so highlights that the work was reviewed and deemed acceptable by the scientific community and also highlights other co- workers who might have contributed to the study. Since the thesis is an evaluation of a student's body of research, it is important for a student to emphasize in the thesis chapters the work s/he did herself versus that done by collaborators.

An example of a chapter title page that includes published data is provided below:

Chapter 2: Analysis of Centromeric Activity in Robertsonian Translocations: Implications for a Functional Acrocentric Hierarchy
Chapter 2 was modified from a manuscript (of the same title) published in Chromosoma 103: 459-467 (1994). The authors were Beth A Sullivan, Daynna J Wolff, and Stuart Schwartz.

Last chapter: Discussion and Future Directions. **The last chapter of the thesis document is not to be an afterthought, and in fact, is one of the most important chapters of the entire thesis.** The Discussion/Future Directions chapter is the place in which the student puts their thesis work in a broader biological/medical/translational context and expands on the future possibilities for the work. This chapter should easily be more than 10 pages (double-spaced) and should reflect the imprint of the student's own thoughts.
What are the implications of your work to your specific field and more importantly, to biology in general? How have you contributed a vertical step in knowledge to the field? If you could stay in the lab for 5 more years, describe the next experiments you would do. What would be the predicted results of those experiments, what would they mean, and in which direction could that then lead the project?

ORAL PRESENTATION/DEFENSE:
All MGM students are required to give a dissertation seminar. This seminar is open to the public. A "closed session" with the committee begins after the seminar.

Format of the dissertation seminar: The dissertation presentation should be conducted as a **professional seminar** in which the student presents their thesis research, including

background, gap in knowledge, goals of the thesis, experimental approaches, and resulting data. Importantly, rather than presenting the data as a laundry list of experiments, the student should strive to tell a scientific story. What was the research question, how did you test the question (or existing paradigms), interpret the results, and how does your data fit into existing or new models? Students should view the dissertation seminar as a way to showcase their growth into a more mature scientist, public speaker, and scientific communicator.

* Students should keep in mind that the public thesis defense is a seminar presentation to be conducted in a professional manner, similar to a postdoctoral job talk. However, the program recognizes that the acknowledgment section for this presentation may be expanded to also include friends and family. As a guideline to maintain an overall sense of professionalism, the thesis acknowledgments made during the public defense should be relatively succinct. Please note that additional acknowledgments can also be made at celebrations occurring after the seminar and defense.

Oral (private) defense: Questions asked on the final examination should concern the candidate's dissertation and related matters. The examination is oral and normally extends for two hours, but not more than three. After the examination, the candidate will be excused from the room, and the committee will discuss the dissertation, oral presentation, and answers to questions both in the public and private defense.

Successful completion of the final examination requires at least three affirmative votes (including that of the dissertation supervisor) and not more than one dissenting vote. Assuming all members vote affirmatively, each signs their name on the acid-free and first copy of the abstract title page, and on the certificate of examination to the Dean (doctoral exam card). These signatures signify that the abstract of the dissertation is suitable for publication in Dissertation Abstracts.

AFTER THE DEFENSE:

Forms: The signed final examination certificate and one copy of the signed dissertation pages must be submitted to the Graduate School. The originals of these forms are kept in the Graduate School office as your official record.

Revisions to the document: The student then has lesser of **30 days** or **until the semester deadline** to complete all corrections for the dissertation. If the committee requests additions or changes to the document, revision deadlines should not be used as an excuse to submit an incomplete or unsatisfactory document. Remember, giving the document to the committee 3 weeks before the defense date will provide ample time to receive and make major changes to the written document.

OTHER INFORMATION:TERMINAL MASTER'S DEGREE:

In the event that a student leaves Duke or MGM before completing the Ph.D., a Terminal Master's Degree may be an option. However, this will require discussion and coordination with the DGS and the Graduate School, particularly as once a student formally switches to a Master's degree option, they are not eligible to receive a stipend or tuition payments beyond the end of the

semester. (i.e. it is important that the timing be such that they graduate the same semester that they would make the switch).

1. The regulations in the Graduate School Bulletin on "Degree Regulations--The Master's Degree," and "Additional Master's Regulations" will apply. Note, although there is no specified number of course units required for the Ph.D., the A.M and M.S. program requires a minimum of 30 units of degree credit, at least 24 of which must be graded coursework, and the preliminary examination or a final examination administered by the student's A.M or M.S committee.

CHANGING LABS:

Success in a research lab rests on the interests, motivation, and abilities of the student in addition to interactions between the student and advisor. Occasionally, a change is desired on the part of the student, the faculty mentor, or both.

We would especially request that the person initiating the change (student or faculty) inform us as soon as possible in the process, even if no firm decision has been made. This allows us to actively participate in the process from the start, should that be determined to be the best course of action. We can help guide the process. The sooner the MGM leadership is informed of potential issues or a desire to change labs, the better, as this will allow us to present all available options to the student and the mentor.

MGM leadership wants to support the students *and* the faculty during those rare occasions when a change is requested. When a student informs the administration ahead of time of concerns or problems, the leadership can be of much more help and offer as many solutions as possible for a given situation.

STUDENTS TRANSFERRING FROM OTHER PROGRAMS (e.g., CMB, MSTP, DSCB, Integrated Toxicology) WHO AFFILIATE WITH MGM:

If you entered Duke Graduate School through non-degree granting programs (e.g., CMB if matriculated 2021 or prior, DSCB, or ITEH), you will need to affiliate with a degree-granting program/department at the end of your first year. If your PI is affiliated with MGM, you have the option to join MGM. If your PI is not affiliated with MGM, you are encouraged to join your new lab's departmental graduate program. To join MGM, you must complete the application form (before September 1st of the 3rd semester) and schedule an in-person interview with the DGS. If you are accepted into the program after this, you must fill out a Thesis Lab Affiliation Form (found on the MGM website, other program websites, or with the Program Office of your specific program), have it signed by your advisor, the MGM DGS, and the chair or business manager of the PIs department.

It is necessary that you fulfill ALL of the MGM requirements described elsewhere in this handbook (but see below). As a result of this rule, you may have to take classes in your second and third years if previous classes taken in the other umbrella program did not cover the material in required MGM courses. It is a good idea to review your transcript with MGM's DGS when you meet to have them sign your Affiliation Form, to ensure that you have everything in order.

There are only a few exceptions to the above: those who join MGM after the first year *from other programs* are not required to take MGM 701 (this course is for 1st year MGM students only).

Enrollment in MGM 793 is still mandatory for Year 2 and MGM 790s \ Years 2 and 3. MGM 790s is not required for third year or later, but students are strongly encouraged to attend the seminars. Students should be aware that they will be called upon to present their research in MGM 790s, starting in the 2nd year until they graduate. Enhancing students' public presentation skills is a major training goal of MGM. Throughout your graduate career, the original of all future documents (Committee Approval Form, Prelim form, Committee Meeting evaluations/reports, etc.) should be given to the MGM office. A copy of these forms will be provided to your departmental program office if necessary. Moreover, do not forget to complete the requirements of your original program (example: attending certain seminars).

All students who transfer from other programs are expected to meet the performance expectations, requirements, and deadlines of MGM. This includes selecting one's committee, scheduling the preliminary exam, and adhering to other MGM guidelines and requirements. At the end of your second year, your funding will transfer from your program's funding to one supported by your lab. Contact your program coordinator for information about this new source of funding. It is your responsibility to set up your payroll through your department.

MGM STUDENT BODY COMMITTEE:

Mission Statement:

The student body has a primary commitment to academic performance and scientific productivity, but it also participates in organizing MGM student activities. The student body leadership operates under the purview of the graduate program leadership and communicates directly to the program coordinator, program director, co-director, and DGS.

Description and Role of Student Body Leaders:

All leadership positions will be filled at the "Annual MGM Student Body Meeting" at the beginning of the new school year in the fall.

The following are the current activities for which leadership opportunities are available:

1. Student Chair Representative
2. Recruitment
3. GPSG representatives
4. McGinnis Lecture
5. A/V Committee
6. MGM 790s (Friday seminar committee)
7. Social Events (Opening Picnic, Christmas Party)
8. Curriculum Committee
9. DEI&A Committee

INFORMATION FOR INTERNATIONAL STUDENTS

Services for International Students:

1) International Office:

This office will process your I-20 Certificate of Eligibility. **The I-20 or the DS-2019 is issued only *after* you have been offered admission, returned the on-line enrollment form, provided verification of the necessary funds, and returned the Request for Temporary Visa Form.** If you are an international student currently attending a U.S. institution and planning to transfer your visa to Duke, your current school must transfer your visa record to the Duke University International Office. It is your responsibility to submit the request to their current school. Only one visa eligibility form will be issued per student. Once you arrive on campus, you will have to register with the International Office. There is usually a mass registration at the end of the Graduate Student orientation, and you should be ready to present all your documents at that time. (You should get information directly from them regarding what is needed). This is also the office you would have to contact in case you want to go back home for a visit. You will have to get your I-20 stamped from them, prior to your visit. You can visit their website: https://studentaffairs.duke.edu/international-students

2) International House:

This is **different** from the office, and helps you to settle into your new surroundings socially. The people working here are really helpful, and will guide you about housing, groceries, banks, phones, cars, driving permits, taxes, getting a SSN and ITIN (see below) etc. Attending the special orientation for new International Students, a few days before the Graduate School orientation, is highly recommended. Additional information can be found at their website: https://studentaffairs.duke.edu/ihouse

3) Finances

If you are an international student, you will be paid for the first two years by a fellowship from the Graduate school directly, and *not by NIH training grants*. However, you will receive exactly the same amount of pay (gross) as your fellow students. In the subsequent years, you will be supported by TA-ships/ project grants from your lab.

***4) Applications to be filled**:*

1) When you enter, you will need to file for an "International Tax Payer's ID number (ITIN)". This is required for you to receive any payment, and is especially meant for international students on a non-compensatory income (such as a fellowship). This can be done at any major bank, such as the main branch of Wells Fargo on Broad Street. You can **contact the International House**, or visit their website, for queries. This will be valid for your first two years.

2) After your second year, once you are on the payroll of your laboratory, you will have to apply for a "Social Security Number (SSN)". For this you will need to visit the Social Security office, along with the required documents. The International House also arranges trips, and you can visit their website for details.

***5) Taxes**:*

Taxes will be deducted at source for all the payments you receive from the graduate school. Certain countries have treaties with the US, and these students will not pay tax. If you are eligible for no taxes, you should contact the Bursar's office and file for exemption.
However, if you do pay taxes, you will file tax returns at the end of the academic year. ***You can contact the International House, or visit their website, to learn more about this process.***

Other Important Information:

Health Insurance: It is mandatory for all students on a F1 / J1 visa to be under the Duke Health Insurance scheme. This will be covered by your fellowship. You will have to accept this scheme on the ACES website.

Vaccinations: Remember to get all your immunizations, and fill them online prior to arrival. You will NOT be allowed to register for classes on ACES if this is incomplete. Contact Duke Health for any queries about the immunizations. See also: https://studentaffairs.duke.edu/health-and-wellness

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