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# DIRECTORY

## A. MICROBIOLOGY GRADUATE PROGRAM FACULTY

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<td>W. Mothes/Microbial Pathogenesis</td>
<td>BCMM 335</td>
<td>203.785.3175</td>
</tr>
<tr>
<td>Titilayo Omotade</td>
<td>6</td>
<td>C. Roy/Microbial Pathogenesis and Immunobiology</td>
<td>BCMM 345</td>
<td>203.737.2409</td>
</tr>
<tr>
<td>Emilee Shine</td>
<td>6</td>
<td>J. Crawford/Chemistry and Microbial Pathogenesis</td>
<td>WC 316A</td>
<td>203.737.3928</td>
</tr>
<tr>
<td>Yiqiao Bao</td>
<td>6</td>
<td>A. Goodman/Microbial Pathogenesis</td>
<td>BCMM 335</td>
<td>203.785.3175</td>
</tr>
<tr>
<td>Ruoxi Pi</td>
<td>7</td>
<td>W. Mothes/Microbial Pathogenesis</td>
<td>BCMM 335</td>
<td>203.785.3175</td>
</tr>
<tr>
<td>Emily Putnam</td>
<td>7</td>
<td>A. Goodman/Microbial Pathogenesis</td>
<td>WC ABC 259</td>
<td>203.737.3174</td>
</tr>
<tr>
<td>Ethan Rundell</td>
<td>7</td>
<td>B. Kazmierczak/Infectious Disease and Microbial Pathogenesis</td>
<td>TAC S140</td>
<td>203.737.5062</td>
</tr>
</tbody>
</table>

### MD/PhD students

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Advisor</th>
<th>Location</th>
<th>Phone</th>
</tr>
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<tbody>
<tr>
<td>Carrie Flynn</td>
<td>3</td>
<td>B. Kazmierczak/ Medicine (Infectious Disease) and Microbial Pathogenesis</td>
<td>TAC S140</td>
<td>203.737.5062</td>
</tr>
<tr>
<td>Grun, Casey</td>
<td>3</td>
<td>B. Kazmierczak/ Medicine (Infectious Disease) and Microbial Pathogenesis</td>
<td>TAC S140</td>
<td>203.737.5062</td>
</tr>
<tr>
<td>Zach Kloos</td>
<td>4</td>
<td>C. Jacobs-Wagner/MCGD and Microbial Pathogenesis</td>
<td>WC ABC 269</td>
<td>203.737.6565</td>
</tr>
<tr>
<td>Christina Lin</td>
<td>6</td>
<td>B. Kazmierczak/ Medicine (Infectious Disease) and Microbial Pathogenesis</td>
<td>TAC S140</td>
<td>203.737.5062</td>
</tr>
</tbody>
</table>

The **Director of Graduate Studies (DGS)** is responsible for the overall operation of the graduate program. The DGS ensures that academic requirements are met, advises students, communicates with faculty and the administration concerning the graduate program and individual students, and in consultation with the Executive Committee, implements changes in the graduate program.

**Dr. Walther Mothes** is the Microbiology DGS.  
**E-mail:** walther.mothes@yale.edu  
**BCMM 336C, 203.737.2203**

The **Registrar** keeps the graduate student files and pre-doctoral training grant records, provides administrative support to the students, the Director of Graduate Studies, Executive Committee, and Pre-doctoral Training Program. The Student Services Officer/Program Registrar also schedules the Program's Seminars and Graduate Students Research-in-Progress seminars.

**Ms. Jennifer Atchley** is the Microbiology Program Registrar.  
**E-mail:** Jennifer.atchley@yale.edu  
**BCMM 354A, 203.737.1087**

The **Microbiology Executive Committee** is comprised of faculty and its role is to review, on an ongoing basis, the operation of the graduate program, to discuss issues that arise concerning the program, and to recommend changes in the operation of the program.

**Microbiology Executive Committee:** C. Roy, W. Mothes, C. Tschudi, J. Galan, and P. Kumar.

**Dr. Anthony Koleske**, Professor of Genetics, is the **Director of the Programs in the Biomedical and Biological Sciences (BBS)** and is responsible for coordinating the various BBS tracks and the academic departments. He also serves to represent the interests of the BBS to the Graduate School (203.785.5624).

**Dr. Richard Sleight**, Associate Dean of the **Biological Sciences**, is the Graduate School official responsible for the graduate program in Microbiology and is the appropriate individual to contact for issues related to the Graduate School (203.432.2274).

**Dr. Barbara Kazmierczak** is the **Director of the MD/Ph.D. Program**, and individuals in this program or considering
this program should consult with her (203.737.5062).

### C. GRADUATE SCHOOL OF ARTS AND SCIENCES

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office Location</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean</td>
<td>Lynn Cooley</td>
<td>Warner House 207</td>
<td>203.432.2733</td>
</tr>
<tr>
<td>Associate Dean, Biological Sciences</td>
<td>Richard Sleight</td>
<td>Warner House 313</td>
<td>203.432.2744</td>
</tr>
<tr>
<td>Assistant Dean, Director Office Graduate Student</td>
<td>Lisa Brandes</td>
<td>HGS 126</td>
<td>203.432-8895</td>
</tr>
<tr>
<td>Admissions Office</td>
<td></td>
<td>Warner House 302</td>
<td>203.432.2771</td>
</tr>
<tr>
<td>Financial Aid Office</td>
<td></td>
<td>HGS 126</td>
<td>203.432.2739</td>
</tr>
<tr>
<td>Assistant University Registrar, FAS</td>
<td>Claudia Schiavone</td>
<td>246 Church St.</td>
<td>203.436.1579</td>
</tr>
<tr>
<td>Senior Administrative Assistant, FAS</td>
<td>Roxanne Niblack</td>
<td>246 Church St.</td>
<td>203.432.2743</td>
</tr>
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</table>

(questions related to admission or readmission to the Graduate School)

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office Location</th>
<th>Phone Number</th>
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</thead>
<tbody>
<tr>
<td>Assistant Dean of Student Affairs</td>
<td>Dr. Nancy Rockmore Angoff</td>
<td>ESH 219</td>
<td>203.737.2169</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office Location</th>
<th>Phone Number</th>
</tr>
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<tbody>
<tr>
<td><strong>Graduate Programs in the Biomedical and Biological Sciences (BBS)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director</td>
<td>Dr. Anthony Koleske</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### D. MEDICAL SCHOOL OFFICES

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office Location</th>
<th>Phone Number</th>
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</thead>
<tbody>
<tr>
<td>Dean</td>
<td>Dr. Robert J. Alpern</td>
<td>SHM C-203</td>
<td>203.785.4672</td>
</tr>
<tr>
<td>Deputy Dean for Faculty Affairs</td>
<td>Dr. Linda K. Bockenstedt</td>
<td>TAC 5525C</td>
<td>203.737.5430</td>
</tr>
<tr>
<td>Deputy Dean for Scientific Affairs (clinical departments)</td>
<td>Dr. Brian R. Smith</td>
<td>55 Park St., Rm 218</td>
<td>203.688.2286</td>
</tr>
<tr>
<td>Deputy Dean for Faculty Affairs (basic science departments)</td>
<td>Dr. Michael C. Crair</td>
<td>SHM I-202</td>
<td>203.737.1770</td>
</tr>
<tr>
<td>Associate Dean; Ombudperson;</td>
<td>Dr. Merle Waxman</td>
<td>SHM L-202</td>
<td>203.785.4680</td>
</tr>
<tr>
<td>Director of the Office for Women in Medicine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Dean of Student Affairs</td>
<td>Dr. Nancy Rockmore Angoff</td>
<td>ESH 219</td>
<td>203.737.2169</td>
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</tbody>
</table>

**Graduate Programs in the Biomedical and Biological Sciences (BBS)**

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office Location</th>
<th>Phone Number</th>
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</thead>
<tbody>
<tr>
<td>Director</td>
<td>Dr. Anthony Koleske</td>
<td></td>
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</table>
INTEGRATION OF THE MICROBIOLOGY TRACK WITH THE ACADEMIC DEPARTMENTS

The main functions of the Programs in the Biomedical and Biological Sciences (BBS) concern the recruitment of students, the direction of their course of study in their first year at Yale, and their assignment to the academic departments for their subsequent course of study including their thesis research. Applicants apply to one of the component tracks of the BBS, rather than to an individual department. The tracks are designed to be more interdisciplinary and more broadly based than the departments and are currently the following:

- Biochemistry, Biophysics, and Structural Biology
- Computational Biology & Bioinformatics
- Immunology
- Microbiology
- Molecular, Cell Biology, Genetics & Development
- Molecular Medicine, Pharmacology and Physiology
- Neuroscience
- Plant Molecular Biology

Applicants to each track are evaluated by an admission committee made up of faculty affiliated with the track, and they are admitted to the BBS and not to an individual department.

The Microbiology Track is administered through the Department of Microbial Pathogenesis, and in general
Microbiology students in the first year will be subject to the policies of the Graduate Program in Microbiology. Walther Mothes serves as the director of graduate studies (DGS) of the Track and Jennifer Atchley serves as the registrar. Microbiology students are required to attend the weekly Microbiology seminars; in addition, all Microbiology students should attend the research-in-progress series given by the students in the Microbiology Program and attend the Microbiology Program annual retreat, held in the fall. However, as described below, students entering the Microbiology Track may carry out laboratory rotations or thesis research in any department affiliated with the BBS.

During the first year, all Microbiology students must carry out three research rotations at Yale [MBIO 670, 671, 672 Advanced Research Laboratories]. Students are permitted to rotate in essentially any biological science lab at Yale, with the approval of the DGS. Rotations are not restricted to faculty listed in the admitting track or to laboratories in any particular department, and students are free to switch to a different track if their interests change. At the end of the first year, each Microbiology student declares a laboratory for thesis research. In the great majority of cases, the student will then formally join either the Microbiology Graduate Program or the department of his/her thesis advisor and be subject to the policies and requirements of either the Microbiology Graduate Program or those of another BBS graduate program. The qualifying examination, taken in the second year, will be administered by the Microbiology Program or other BBS graduate program that the student chooses to join.

The Microbiology Program does not have a specific set of formal course requirements. However, students are required to take 4 semester long courses, three of which must be Microbiology courses (see below). All course schedules must be approved and signed by the DGS. The requirements of the Microbiology Program are described in detail in this booklet, and the requirements of other departments or BBS tracks can be found in the appropriate departmental booklet.

PROGRAM OF STUDY

The Microbiology Graduate Program offers a broadly-based program of instruction and research in microbiology leading to the Ph.D. degree, preparing its graduates for independent careers in research and teaching. The central component of the graduate program is the successful completion of original dissertation research and the preparation of a written dissertation under the direct supervision of a member of the faculty. Prior to undertaking full-time dissertation research, each student must also successfully complete four graduate level courses, carry out short research rotations in three laboratories, pass the Qualifying Examination, and fulfill a number of additional requirements. Throughout a student's stay at Yale, he or she is expected to participate in several program activities. Most students require five to six years to complete the program.

This handbook together with the most recent Yale University Graduate School Programs and Policies (available online at http://www.yale.edu/graduateschool/policies/) are the sources of information on the requirements in Microbiology. The student is responsible for knowing these requirements and for meeting them in a timely manner.

A. Course Work

1. Formal Graduate Level Courses

Because students enter the Microbiology Track with widely varying background and interests, each student's program of courses is designed individually in consultation with the DGS and must be approved by the DGS, who may require a student to take a specific course to correct a deficiency.

The Department requires that each student pass at least four graduate level semester courses (excluding the ethics course IBIO 601, seminars “Seminal Papers in Modern Microbiology” [MBIO 700] and “Evasion of Host Defense by Viruses, Bacteria and Eukaryotic Parasites” [MBIO 705]) and the DGS may require additional courses for individual students.

Students are required to take a minimum of three courses listed as microbiology courses. In addition, students are encouraged to take some of the main immunobiology and cell biology courses.
### Required Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>When</th>
</tr>
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<tbody>
<tr>
<td>MBIO 670, 671, 672</td>
<td>Laboratory Rotations</td>
<td>First year</td>
</tr>
<tr>
<td>MBIO 700, MBIO 705</td>
<td>Dr. Priti Kumar’s Seminars</td>
<td>First/Second year</td>
</tr>
<tr>
<td>MBIO 703, 704</td>
<td>Microbiology Seminars</td>
<td>Both fall and spring</td>
</tr>
<tr>
<td>MBIO 701, 702</td>
<td>Research in Progress Seminars</td>
<td>Both fall and spring</td>
</tr>
<tr>
<td>IBIO 601, BBS 503</td>
<td>Fundamentals of Research/RCR</td>
<td>First or second, and fourth year (BBS 503)</td>
</tr>
<tr>
<td>DISR 999</td>
<td>Dissertation Research</td>
<td>Every semester following admission to candidacy</td>
</tr>
</tbody>
</table>

At least 3 courses listed as Micro courses (MBIO). Any 3 from the list below are acceptable. **NOTE**: at least 4 courses must be taken in total.

### Courses to Choose From

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBIO 686</td>
<td>Biology of Bacterial Pathogens Part I (fall)</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>MBIO 685</td>
<td>Biology of Bacterial Pathogens II (spring)</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>MBIO 734</td>
<td>Molecular Biology of Animal Viruses (spring)</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>MBIO530</td>
<td>Biology of the Immune System (fall)</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>PATH 690</td>
<td>Molecular Mechanism of Disease (fall)</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>MBIO 680</td>
<td>Eukaryotes (spring)</td>
<td>First/Second Year</td>
</tr>
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</table>

### Other recommended courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>When</th>
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</thead>
<tbody>
<tr>
<td>CBIO 602</td>
<td>Molecular Cell Biology</td>
<td>First/Second Year</td>
</tr>
<tr>
<td>PATH 640 / BBS 640</td>
<td>Developing and Writing a Scientific Research Proposal</td>
<td>Anytime</td>
</tr>
</tbody>
</table>

**NOTE**: MBIO 670, 671 & 672, IBIO 601, MBIO 700, MBIO 703 are graded on a satisfactory/unsatisfactory basis.

Course grades in the Graduate School are recorded as *Honors, High Pass, Pass, and Fail*, and the graduate school requires a grade of *Honors in at least two semester courses*. Typically, students take 2 or 3 courses each semester for their first two semesters. Research and some seminar courses are graded as Satisfactory or Unsatisfactory and cannot be used to fulfill either the four-course or the honors requirement. For example, MBIO 670, 671 & 672 *Advanced Research Laboratories*, IBIO 601 *Fundamentals of Research*, and the seminars MBIO 700 and MBIO 705 may **not** be used to fulfill the four-course or Honors requirements. You will be informed by the DGS if you decide to enroll in a course that would not fulfill either of these requirements. It is recommended that course requirements be completed by the end of their second term, so that students will be able to take the Qualifying Examination during the third term.

Although it is not required for completion of the PhD, a course in Grant writing will be arranged for first year students. Other interested students may join with the permission of their advisor. Your student services officer will send details about such courses.

### 2. Research conduct and academic integrity

The scientific ethics requirement may be fulfilled during the first or second year of study: IBIO 601 *Fundamentals of Research* that is offered every other year may be taken for this purpose. This course does not count toward meeting the four course or honors requirement, and it is graded on a satisfactory/unsatisfactory basis.

NIH requirements now require retraining in the fourth year, which will have to be fulfilled by taking the BBS 503 RCR Refresher for Senior BBS Students.
“Academic integrity is a core institutional value at Yale. It means, among other things, truth in presentation, diligence and precision in citing works and ideas we have used and acknowledging our collaborations with others. In view of our commitment to maintaining the highest standards of academic integrity, the Graduate School Code of Conduct specifically prohibits the following forms of behavior: cheating on examinations, problem sets and all other forms of assessment; falsification and/or fabrication of data; plagiarism, that is, the failure in a dissertation, essay or other written exercise to acknowledge ideas, research, or language taken from others; and multiple submission of the same work without obtaining explicit written permission from both instructors before the material is submitted. Students found guilty of violations of academic integrity are subject to one or more of the following penalties: written reprimand, probation, suspension (noted on a student’s transcript) or dismissal (noted on a student’s transcript).

Plagiarism, whether deliberate or through negligence or ignorance, is a serious violation of conduct at the Graduate School. We are all required to acknowledge the sources of existing ideas and statements, including the copying, manipulating, and paraphrasing of electronic materials that appear in our own work. Similarly, students must be aware of the rules for collaboration on assignments, rules that should be spelled out in the syllabi of all courses, including those in which no collaboration is permitted. Students should also understand clearly that written assignments must start with a blank page on which they write their own, original text based on their own ideas. The ideas of others, whether transcribed literally or reformulated, must be cited.

Faculty members may not privately adjudicate instances of cheating of which they become aware. They are required to bring any evidence of cheating or plagiarism to the attention of the Dean of the Graduate School. The Dean’s Office settles most cases without a formal hearing, but if the student disputes the charges, the case will be referred to the Graduate School Committee on Regulations and Discipline.

Additional information is available at (http://www.yale.edu/printer/bulletin/htmlfiles/grad/policies-and-regulations.html#personal_conduct).”

3. Graduate Student Seminar Courses

All first and second year students in the Microbiology Program are required to take MBIO 700 Seminal Papers on the Foundations of Modern Microbiology and MBIO 705 Evasion of Host Defenses by Viruses, Bacteria and Eukaryotic Parasites directed by Peter Tattersall. In these seminar courses, each student prepares and delivers a seminar based on the critical papers in the literature and discusses presentations by other students. Each semester the seminar courses are led by faculty members, and the topics are chosen based on important discoveries in the history of Microbiology. These are non-credit courses offered every other year.

B. Requirements for MD/PhD students

Coursework: MD/PhD students must take a minimum of three courses, two of which must be Microbiology courses. All students must obtain two Honors grades in their courses to remain in good academic standing. At the discretion of the DGS, credit may be given for advanced courses taken in the medical school that were graded, and an Honors grade obtained in one of these courses may count toward the Honors requirement.

Laboratory Rotations: MD/PhD students are encouraged to think carefully about choosing a mentor and may need to perform up to three rotations to make this important choice. They are encouraged to begin rotations during the summer after their first year at Yale. However, if the MD/PhD student identifies a mentor early during the course of the rotations, he or she is not required to complete three rotations if the proposed mentor and DGS support the choice of the student.

Teaching: MD/PhD students are required to fulfill one teaching requirement. Previous teaching in Histology or MCDB may count towards this requirement at the discretion of the DGS.

Qualifying Exam: MD-PhD students are encouraged to take the qualifying exam once their coursework has been completed and they have identified a mentor and a thesis project. This exam should take place as soon as practical, and certainly before entering their third year in the PhD program. For details on the exam, please consult the appropriate section within this Microbiology Program Handbook.
Prospectus: MD-PhD students should submit their prospectus after experimental work has validated that the qualifying proposal represents a good outline for the thesis project. In this case the qualifying proposal will be accepted as the prospectus. If the project changes significantly the student is encouraged to write a new prospectus. The prospectus must be approved by the thesis advisor and the thesis committee.

Candidacy: MD/PhD students are admitted to candidacy once they have completed their coursework and obtained two Honors grades, passed their qualifying exam, and submitted their dissertation prospectus.

Thesis Committee: MD/PhD and PhD students are required to have one thesis committee meeting per year. However, students are strongly encouraged to consider having additional meetings if they feel their project could benefit from the assistance of members of their thesis committee.

C. Laboratory Rotations

All 1st year students are required to carry out research rotations in at least three separate laboratories. This exercise is formally listed as MBIO 670, 671 & 672 Advanced Research Laboratories. Each rotation typically lasts between 8 and 12 weeks, during which time the student is expected to actively participate on a daily basis in a research project under the direction of a faculty member. Rotations are graded satisfactory or unsatisfactory, and the faculty sponsor provides the DGS with a brief written evaluation of each student's performance.

A primary purpose of the research rotations is to identify a laboratory in which dissertation research will be carried out, so rotations should be performed in laboratories that are being considered as possible homes. Rotations allow the student to find out what particular laboratories and faculty members are like and give the faculty a chance to assess how well a particular student fits into the laboratory. Rotations also serve to introduce students to a number of techniques and approaches that may not be in use in the laboratory eventually selected for dissertation research. Therefore, the three-rotation requirement will not be waived merely because a student has already made a final decision concerning a dissertation laboratory.

Rotations are normally scheduled by direct discussion between the student and individual faculty. The DGS must approve all rotations and should, therefore, be consulted before finalizing rotation arrangements. In the 2019-2020 academic year rotations will begin no later than September 10th, but students and faculty are encouraged to discuss prospective rotations as follows:

**Rotation talks will be from 1:00-4:00 PM on the following dates and locations:**

- **1st rotation talk** Friday, November 15, 2019 – HOPE 216
- **2nd rotation talk** Thursday, February 13, 2019 – HOPE 216
- **3rd rotation talk** Friday, April 24, 2019 – HOPE 103

Because certain laboratories tend to be popular with students, a student should not wait until the last minute to attempt to schedule rotations. Students must identify a laboratory for their thesis by the end of the first year. Thus, student should only rotate in laboratories willing to take students. If necessary, a student can perform a fourth rotation. Each rotation concludes with rotation talks. All first-year students and the DGS will attend the talks and all rotation advisors and rotation lab members will be invited. Rotation students will prepare 15-minute talks consisting of a short introduction, the project aims, experimental results, conclusions and Q&A. A total of 7-8 slides are recommended.

D. Fellowships and Grant writing

After joining a lab, students are strongly encouraged to apply to fellowships. Learning how to write grants is an essential part of the training. Importantly, by applying for fellowships students may be awarded with a prestigious fellowship, which would strengthen their CV and contribute to the financial health of their laboratories. All American students are expected to apply for a NSF fellowship at the beginning of their second year. All foreign students are expected to apply for the HHMI fellowship. The Watkins Fellowship and HHMI Gilliam Fellowship are devoted to increase diversity among scientists. The Graduate Writing Center (GWC, now part of the Yale Center for Teaching and Learning) holds classes and workshops targeting students who are interested in learning proper grant writing. Each year a single lecture is devoted to
the specifics of the NSF application. Your Student Services Officer will send respective announcements to all students.

Also, the PATH 640 / BBS 640 course is specifically devoted to grant writing.

- **NSF Graduate Research Fellowship Program** – three years of support is provided by the program for graduate study in science or engineering and leads to a research-based master's or doctoral degree. To succeed with an NSF application, attention needs to be devoted to the “broader impacts”. Following rule changes, every student can only apply once during graduate school, ideally after the selection of a thesis advisor when the thesis project is known. [www.nsf.gov/grfp](http://www.nsf.gov/grfp)

- **Howard Hughes Medical Institute Grants for Science Education**: Each year, HHMI awards ~25-50 fellowships to graduate students. Support is for awarded three years, but not beyond the 5th year. Yale University can nominate 10 second or third year students. The internal nomination process involves endorsement by the DGS of each BBS track followed by nomination of an institutional committee. [http://www.hhmi.org/programs/science-education-research-training](http://www.hhmi.org/programs/science-education-research-training)


- **ASM Robert D. Watkins Graduate Research Fellowship**: The goal of the fellowship is to increase the number of underrepresented groups completing doctoral degrees in the microbiological sciences. [http://www.asm.org/index.php/grants/25-education/students/164 asm-robert-d-watkins-graduate-research-fellowship](http://www.asm.org/index.php/grants/25-education/students/164 asm-robert-d-watkins-graduate-research-fellowship)

- **Howard Hughes Medical Institute Gilliam Fellowship**: In 2014, the HHMI vastly expanded the number of fellowships committed to increasing diversity among scientists. [http://www.hhmi.org/programs/gilliam-fellowships-for-advanced-study](http://www.hhmi.org/programs/gilliam-fellowships-for-advanced-study)

- **Ford Foundation Predoctoral Fellowships** - in 2015, the Ford Fellowship program will award approximately 60 predoctoral fellowships. The predoctoral fellowships provide three years of support. [http://sites.nationalacademies.org/PGA/FordFellowships/PGA_047958](http://sites.nationalacademies.org/PGA/FordFellowships/PGA_047958)

- **AAAS Science & Technology Policy Fellowships** - Provides opportunities for scientists and engineers to learn first-hand about policymaking and implementation while contributing their knowledge and analytical skills to policymakers. [http://www.aaas.org/page/fellowships](http://www.aaas.org/page/fellowships)

- **American Association of University Women (AAUW) Educational Foundation and American Fellowships Dissertation Fellowship**: There are several funding opportunities available for educational programs that directly benefit women and girls. Every year AAUW awards fellowships and grants to more than 200 women. [https://aauw.scholarsapply.org/amdissert/](https://aauw.scholarsapply.org/amdissert/)

- **Paul and Daisy Soros Fellowship Program**: This $90,000 merit-based fellowship supports immigrants or the children of immigrants, who are pursuing graduate school in the United States. In 2019, the program awarded 3 Yale graduate students with up to $90,000 over a two-year period. [https://www.pdsoros.org/](https://www.pdsoros.org/)

E. **Qualifying Examination**

The qualifying examination is administered by the Microbiology Program for all students who have formally chosen the Program as their home program. The quality of the thesis will be the higher the earlier the student becomes familiar with the relevant scientific fields. Therefore, the student is encouraged to qualify in the fall of the second year (3rd semester), shortly after joining the thesis laboratory. Ideally the student has fulfilled the four courses and two Honors requirements before qualifying. Exceptions are possible and should be discussed with thesis advisor and DGS. The qualifying exam is written on the thesis topic.

The examination is an opportunity for students to read in depth in areas relevant for the thesis topic, to gain experience in the formulation and preparation of coherent research proposals, and for the faculty to identify whether areas of weakness exist in a student's knowledge that should be corrected. Please note that the qualifying committee may advise the student to take another course that is relevant for the thesis topic. The qualifying examination is described in detail in Appendix 1.

F. **Teaching**
An important aspect of graduate training in Microbiology is the acquisition of teaching skills through participation in courses appropriate for the student’s scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school level. Ph.D. students are expected to participate in two semesters (or its equivalent) of teaching. Students are not expected to teach during their first year. Teaching assignments in fulfillment of the requirement must be approved in advance by the DGS. Microbiology students wanting to serve as teaching fellows after completion of their teaching requirement must obtain the approval of their thesis advisor and the DGS beforehand. Science Education Outreach Program (explained in this Handbook) may be used to fulfill a teaching requirement. Check with the registrar for about this option.

G. Dissertation Research

The centerpiece of graduate education is the dissertation research and the preparation of the written dissertation.

1. Selection of a Dissertation Advisor

The single most important decision made by a graduate student is the selection of a dissertation advisor and laboratory. Each advisor has a distinctive style and approach to science and to graduate education, and it is well worth the effort of carefully investigating potential laboratories before committing several years to a laboratory. The best way to assess a laboratory and one's "fit" to it is to carry out a research rotation in that laboratory. Students should talk to the current members of the laboratory: are they happy and productive? What is the experience of the faculty member in having students successfully complete a dissertation? A student should consider whether he/she wants a big lab with lots of activity or a smaller lab with more day-to-day contact with the advisor. Some students prefer a lab with a high-profile director and potentially more visibility, whereas others thrive with a younger faculty member who is more accessible and who has a more recent memory of graduate student concerns. Other useful sources of information are more advanced students, the DGS, and other faculty. A student should discuss candidly with a potential advisor his or her goals and interests and request the advisor to outline realistic potential projects. However, it is important to realize that a student is selecting an advisor and a laboratory, not a project, because projects have a disquieting way of not working out and several shifts of project may occur before a workable one is identified. The DGS must approve the selection of a laboratory. Occasionally an advisor may decide not to admit a student into a laboratory for any of a variety of reasons, such as lack of space, concerns about funding, or the belief that a particular student would fit in better in a different laboratory. Although students and potential thesis advisors are encouraged to discuss possibilities at any time, they are requested not to make a final commitment to each other for thesis research until the end of April after the last rotation talk.

On rare occasions, students switch dissertation laboratories after dissertation research is begun. When such a switch is contemplated, this should be discussed with the DGS as soon as possible so that all options can be considered in a timely fashion.

2. Thesis Advisory Committee

The thesis advisory committee is an important body that helps each student navigate the shoals of dissertation research. The function of this committee is to periodically review and evaluate progress, provide advice and expertise about the project, and certify when a student has completed sufficient work to begin writing the dissertation. Therefore, the committee should be regarded as an ally and a resource, not an obstacle. On occasion, the thesis committee can help resolve differences between a student and an advisor.

a. Constituting a Thesis Committee

The thesis committee normally is comprised of three to five faculty members, at least two of whom must be members of the Microbiology Program. It is chaired by a member of the Microbiology Program who should not be the thesis advisor. Additional members may be added at later times if deemed appropriate. The thesis committee is selected by the student, in consultation with the advisor and must be approved by the DGS. Faculty who supervised first year research rotations and who served on qualifying examination committees are often appropriate as thesis committee members. Faculty members with expertise in the area of the dissertation research are particularly helpful and should be sought out as thesis committee members. A student should be cautious about suggesting committee members who are frequently unavailable, because their presence on the committee may make it difficult to schedule meetings in a timely fashion. Names, addresses and telephone numbers of committee members should be given to the program administrative
assistant, following approval by the DGS. The BBS encourages all students to aim graduating in 5 years. The thesis committee represents an important mentoring place to accomplish this goal and if needed adjust the research direction to guarantee a successful thesis.

b. Thesis Committee Meetings

The thesis committee must meet for the first time with the third year. The student should canvas the committee members and the advisor for acceptable dates and times and schedule a meeting. Subsequent meetings must be held once a year, or more frequently if desired by the student, the advisor, the committee, or the DGS. Meetings should be convened more often if the research has run into difficulty or if a change of research direction is contemplated. If a student experiences difficulty in scheduling thesis committee meetings, he or she should inform the DGS immediately rather than delay scheduling the meeting.

Prior to thesis committee meetings, the student should prepare a ~two-page outline of the thesis proposal and the progress made. This outline should be distributed to the committee members one week before the meeting and should be discussed with the committee during the meeting. After each committee meeting, the chairman must submit to the DGS and Registrar the Thesis Committee Meeting report form that includes a summary of progress and the discussion at the committee. **Note that a student will not be permitted to register for subsequent terms unless an annual committee meeting is held and the report is submitted to the DGS.** In addition to formal committee meetings, each student should keep in close contact with the individual members of the committee so as to make the best use of their expertise.

At the beginning of the thesis committee meeting, the advisor shall meet with the committee in the absence of the student to update the committee briefly on the student's progress and strengths and weaknesses. After this brief meeting, the student shall meet with the committee in the absence of the advisor. The purpose of this brief meeting is to make the committee aware of any issues, should they arise, that the student does not feel comfortable discussing in the presence of the advisor.

Finally, prior to the committee meeting, the student will take an Individual Development Plan (IDP) assessment, which results will be discussed with the thesis committee at the end of the meeting. An excellent IDP can be found at the Science career website [http://myidp.sciencecareers.org/](http://myidp.sciencecareers.org/). An early self-assessment and discussions with the committee and advisor will promote a better career planning for the student. Note that career plans might change throughout the thesis.

H. Research-in-Progress Series

All students, beginning in their third year, are required to present their research once a year at Graduate Student and PostDoc Research-in-Progress, held on Mondays at 4 PM. These presentations are intended to give each student practice in presenting his or her own work before a sympathetic but critical audience and to familiarize the faculty with the research. Students should not feel compelled to present only polished, finished pieces of work, but also to present on-going projects including a discussion of difficulties, because useful suggestions may materialize. Students should invite their thesis committee and laboratory members to their presentations in advance. Students will have to register each fall and spring semesters for the Research in Progress non-credit courses. Students very late in their thesis after they have received permission from their committee to write their thesis do not have to present in the Research-in-Progress seminars to not dilute the attention from their thesis defense.

I. Dissertation Prospectus

The prospectus is a statement of what the student intends to do for the dissertation, and a thesis committee and thesis advisor approved prospectus must be submitted to the Graduate School in order for a student to be admitted to candidacy at the end of the third year. Because in Microbiology the proposal for the qualifying exam is based on the student’s thesis project, it can de facto become the prospectus in case the project doesn’t change direction significantly. In this case, rather than writing a new document, students may provide to the DGS and registrar a copy of their qualifying exam proposal but with a cover sheet entitled “Prospectus” and containing all other information requested by the Graduate School not in the original written proposal. It is however, important that there is an experimental phase between the qualifying proposal and the prospectus in which the hypotheses put forward in the qualifying proposal are tested. If the project changes direction, the student is asked to revise the proposal accordingly, seek approval of the document from the advisor and thesis committee and submit the prospectus to the DGS. See Appendix 3 The Dissertation Prospectus for more detail. If the student recently applied for a F31 or similar fellowship, the application can be accepted as the Prospectus.

**Students will not be allowed to register for the 4th year of study without an approved Prospectus.**
J. Admission to Candidacy

After all pre-dissertation requirements are successfully completed (Course requirements, Honors requirement, Qualifying Examination, Dissertation Prospectus), a student will be admitted to candidacy for the Ph.D. degree. These requirements are normally met in three years. Please note that fulfillment of the teaching requirement is not necessary for admission to candidacy (it is for Degree conferment). A student who has not been admitted to candidacy will not be permitted to register for the fourth year. Exceptions must be approved in advance by the DGS, the Executive Committee, and the Graduate School Associate Dean.

K. Evaluation of Progress

At the end of the summer term, students in their first and second year receive a copy of their academic record (unofficial transcript). Students may also check their course enrollment status and grades by signing on to the Bulldog Access at HGS using their Net ID.

All students are encouraged to have frequent conversations with the DGS, course instructors, and (in later years) the thesis advisor as well as members of the thesis committee. In addition, students will receive a copy of the summary statement of each thesis committee meeting. In this way, students will develop an accurate, ongoing sense of their own progress. In addition, the Microbiology Executive Committee will formally evaluate the progress of each student at the end of every academic year. In the first and second years, the evaluation will be based on performance in courses, laboratory rotations, and the Qualifying Examination. In later years, the advisor and thesis committee will report to the faculty on the student's thesis research progress. If at any point the faculty finds deficiencies in a student's performance, a detailed letter will be sent to the student by the DGS describing those deficiencies and making suggestions to remedy them.

Finally, at the end of the academic year (5/31) the Graduate School requires a Dissertation Progress Report from students in their 4th, 5th, and 6th year. This report must be completed and signed by the student, by the faculty advisor, and by the Director of Graduate Studies.

GENERAL TIMETABLE OF REQUIREMENTS

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirement</th>
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| 1    | Course Work & Laboratory Rotations  
      | Choose Thesis Advisor and Laboratory (and Program/Department) |
| 2    | Course Work (Honors requirements should be met by the end of the second year)  
      | Begin Thesis Research  
      | Qualifying Examination and Thesis Prospectus (*generally in the fall term*)  
      | Apply for NSF, HHMI or other fellowships  
      | Teaching Requirement (in the second year *only after passing the qualifying exam and with permission of the DGS*) |
| 3    | Thesis Research  
      | Teaching Requirement  
      | Thesis Committee Meeting (*first meeting must occur before December 15*)  
      | Research-in-Progress Presentation  
      | Update Thesis Prospectus (*only if research has significantly changed*)  
      | Admission to Candidacy (paperwork submitted during the summer of 3rd year) |
| 4, 5 | Thesis Research  
      | Thesis Committee Meeting  
      | Research-in-Progress presentation |
| Final Year | Complete Thesis Research and have Final Thesis Committee Meeting  
            | Write Thesis and Obtain Approval of Advisor and Committee Members  
            | Petition for Ph.D. Degree and Submit Final Thesis to the Graduate School |
Present Thesis Seminar
Review Readers’ Reports and Make Any Corrections
Research-in-Progress attendance and presentation in fall (if graduating in spring)
Present Hard-Bound Copy of Thesis to the Microbiology Graduate Program Office

PROGRAM ACTIVITIES

In addition to the formal academic requirements outlined in previous sections, students are expected to participate in various departmental activities.

A. Research-in-Progress

A Research-in-Progress series, in which one student and one postdoc present their research, are held on Mondays at 4 p.m. Students are required to attend the Research-in-Progress series and are encouraged to participate in the discussion. Students, faculty and fellows attend the Research-in-Progress series. Students should specifically invite their thesis committee members and their laboratory members to their presentations. Ideally the thesis committee meets right after the RIP.

2019-2020 Research-in-Progress dates:
September 30
October 14, 21, 28
November 4, 18
December 2, 9, 16
January 27
February 3, 10, 17, 24
March 2, 23, 30
April 6, 13, 20, 27
May 4

B. Seminars

Microbiology Seminars are held on Thursday afternoons at 4:00 p.m. in Hope 216 or other locations as specified, preceded by coffee/tea at 3:45 p.m. Microbiologists from around the world are invited to describe their research. Students are expected to attend Microbiology seminars. Frequently, interested students will be invited to meet with seminar speakers for an informal lunch. In addition, third year students as a group are encouraged to invite and serve as host for two speakers each year. Students will have to register each semester for the seminar series non-credit course.

C. Departmental Retreat

The Microbiology Retreat, a week day program of informal research talks and discussions. The 2019 microretreat is scheduled for Friday, September 13, 2019 at the Yale West Campus, West Haven. Faculty, students and fellows attend this function. The Retreat provides an outstanding opportunity to keep up to date with the diverse research underway in the program and to participate in vigorous scientific discussions. Students are expected to attend the Retreat and are encouraged to present their research in form of a poster. The best posters are selected by a faculty committee for podium presentations. For information about the 2019 Microbiology Retreat, contact Bonnie Lemelin (Office Manager, BCMM 336E) at bonnie.lemelin@yale.edu, or call her at 203-737-2404.

D. New Student Recruitment

Description: Recruitment weekend usually falls on either the first or second weekend in February. The 2019-2020 recruitment weekend is scheduled for February 20-22, 2020. The student recruits arrive on a Thursday evening and attend an informal dinner with students and faculty. On Friday, the recruits attend interviews during the day, have a tour of the medical campus, and then attend the organized dinner. On Saturday, the recruits go to a BBS poster session, have a tour of the old campus, and then attend a dinner at a microbiology student’s house. On Sunday the recruits arrange travel to return home.
**Student Responsibilities:** Since there are a large number of recruits every year that come to the microbiology track recruitment weekend (20-25) it is expected that all students in the microbiology track act as a host for at least one of the recruits. If you are unable to be a student host on our recruitment weekend, please notify the Program’s Registrar who will arrange for you to be a student host for a recruit that is unable to come on the recruitment weekend. Additionally, since a large part of the recruitment weekend is organized by microbiology students, it is expected that students will volunteer for additional activities as well. The success of recruitment weekends in the past has been dependent on the involvement of microbiology students.

As a student host, you are required to take recruits to their interviews on Friday. Additionally, you are expected to attend the dinners on Thursday, Friday and Saturday. As a student host, not only do you have to show around your recruit and answer his/her questions, but also you are expected to evaluate the student and determine whether they would be a good fit for the program. You can also evaluate other recruits you met during recruitment weekend. The admissions committee takes these evaluations into consideration as well as faculty reviews when deciding which recruits to offer admission. Depending on the desired class size and the availability of funds, about 70-90% of the recruits will be offered admission.

During the recruitment weekend, we also need student volunteers to present posters at the BBS brunch, give a Yale and New Haven overview presentation on Thursday, escort students to dinner on Thursday, act as medical campus tour guides, volunteer their apartment for the apartment tours, act as tour guide for apartment tours and around old campus on Saturday, host dinner on Saturday night, and drive the recruits to dinner on Saturday.

**E. Student only activities**

Students can organize leisure activities that are non-academic in nature. Any student may suggest activities that would benefit both individual students and the Microbiology team. The student contact is Emilee Shine (emilee.shine@yale.edu). Upon approval, the Microbiology program will fund such activities.

**RESEARCH EXPENSES**

**A. Supplies**

In general, costs of research supplies and equipment are covered by grants and contracts held by the faculty member in whose laboratory research is carried out.

First year students have a $300 allowance for purchasing textbooks. Confirm the deadline for receiving these funds with your registrar (deadline may vary).

**B. Travel to Scientific Meetings**

Attendance at scientific meetings is an important part of graduate education. Most training grants today have resources to support travel to meetings once a year. Limited travel funds are also available to students who request them. Students wishing to request such support, should see the registrar or the DGS, giving them the following information: title, place and time of the meeting; relevance to the research; (if applicable), title and authors of paper being presented; amount required for travel, registration, food, and lodging. Preference for travel funds will be given to students who have passed the qualifying examination and especially to students scheduled to present a paper or a poster at the meeting.

Travel Advances and Expense Reports for students are processed through the Graduate Program Office.
FINISHING UP

A. Preparation of the Dissertation

PART 1:
1. Have a final committee meeting where you get your committee’s approval to write your thesis and graduate.
2. You, with the help of your PI, write your thesis. Your PI serves as your primary editor. Your PI may not serve as an official referee for your thesis.
3. Submit to your thesis committee an unofficial copy of your thesis for editing. This can be done after you and your PI are satisfied with the thesis or during the process, depending on the committee’s preference.
4. Revise the thesis based on the unofficial comments you receive from your committee.
5. Decide on your three readers, two from inside Yale and one from outside of Yale following discussions with your thesis advisor.
   a. Email the name of scientist that is outside of Yale, which you and your PI have decided on to the registrar Jennifer Atchley (Jennifer.atchley@yale.edu). The registrar will contact the external reviewer and ask if he/she is willing to review the dissertation.
   b. Identify two scientists from inside of Yale in discussions with your thesis advisor. These scientists will serve as your internal referees for your thesis. Usually these scientists are members of your thesis committee.
   c. Fill out a “Notification of Readers Form” online and submit the three readers: https://ivy.yale.edu/dissertationreview/dissertation_submissions The DGS will review and approve the readers
6. Now you are ready to officially submit your thesis to the graduate school.

PART 2:
   The checklist link includes an exit survey as well as a form indicating which degree you are petitioning for. Also, there are official instructions on what type of paper to use for your thesis and how to format the thesis. And, it tells you the fee you must pay to graduate; of course.
8. Submit a PDF copy of your thesis to the graduate school before the deadline designated by Yale. This copy will be given to the referees. This deadline is usually October 1 for fall graduation or March 15 for spring graduation. Ask your registrar for further information.
9. Submit one unbound copy of your thesis to the graduate school, along with the forms and fees before the deadline. This copy will be sent, after you graduate, to be microfilmed and placed in a national database.
10. Sometime during this process, defend your thesis. You do not have to defend before you submit your thesis officially, but you should defend before the department meets to decide who will graduate. You should check with the DGS when this meeting will be and plan accordingly.
11. Wait to get the readers comments back and make corrections if necessary.
12. Don’t forget to pay your school bills and fees.

B. Completion of Dissertation Research

The thesis committee should meet and certify that dissertation research is essentially finished before a student begins writing the dissertation. In practice, about six months before a student anticipates finishing laboratory research, a meeting of the thesis committee should be convened, and agreement reached concerning what final experiments are needed before the work is deemed complete. When the experiments are completed, it is appropriate to begin writing. If difficulties arise or it is unclear whether the final experiments were successful, another meeting of the thesis committee should be held, and a decision reached whether or not further experimentation is required. A timetable is required for completion of dissertation.

C. Ph.D. Dissertation

1. Writing the Dissertation
The Graduate School provides a booklet of instructions for the preparation and presentation of the doctoral dissertation. A Dissertation Submission Packet is available at the Graduate School Information as well as from the Microbiology Graduate Program office. Useful websites: You can download the “Guide to Formatting the Doctoral Dissertation” here: [http://gsas.yale.edu/sites/default/files/formatdissertation.pdf](http://gsas.yale.edu/sites/default/files/formatdissertation.pdf)

Most students devote one to several months of full-time effort to writing their thesis. The Program and the Graduate School expect the thesis advisor and the thesis committee members to be actively involved in assuring the quality of the thesis by reading unbound copies and offering constructive criticisms. Some advisors are willing to read the thesis on a chapter-by-chapter basis as it is being written, while others prefer to see a complete version. Most committee members prefer to see the complete version, after the comments of the advisor are incorporated. Each student should discuss the schedule of writing and review early in the process with the advisor and committee members. The draft of the thesis should be given to all committee members at least 3 weeks prior to the submission date. Each committee member will provide written and/or verbal comments that the student should address in the copy of the thesis that is delivered to the Graduate School and sent to the official readers. The student must obtain approval from the advisor or DGS of the final version before it is finally submitted.

Graduate School degrees are awarded in December and May. Students must file a petition for degree with the Registrar (see Yale University Graduate School Programs and Policies “Blue Book”). Forms and instructions are available from the Graduate Program office or the Graduate School. Final deadlines for petition and submission of dissertations to the Graduate School are usually on October 1 (for December degrees) and March 15 (for May degrees). It is important that the thesis committee has enough time to provide feedback on the thesis. Therefore, the student is asked to provide the thesis committee with a copy two weeks prior to the fall or spring submission deadlines. The Graduate School requires one original unbound copy as well as three softbound copies (one for each reader). In addition, one bound copy is required for the Department Library (the student is reimbursed for this hardbound copy by submitting a receipt with the bound dissertation to the Graduate Program office), and normally students also prepare additional copies for their thesis advisor and all members of the thesis committee.

Online Notification of Readers (ONOR): [http://www.yale.edu/dissertationreaders](http://www.yale.edu/dissertationreaders)

2. Evaluation of the Dissertation

The dissertation will be judged by two "inside" readers (both may be members of the thesis advisory committee, but not the thesis advisor) and one "outside" reader (who cannot be a member of the thesis committee, a member of the faculty of the Microbiology Program, or a collaborator on the thesis project or on a closely related project of the advisor). Outside readers are usually from another institution. The outside reader provides an impartial critique that helps the Graduate School to judge the quality of the thesis and to evaluate its own processes of review. Readers should be chosen by the advisor in consultation with the student and must be approved by the DGS. After the DGS approves the selection of the readers, the student invites the inside readers to evaluate the thesis. The DGS invites the outside reader to evaluate the thesis, but neither the student nor his/her advisor should communicate directly with the outside reader about the thesis at any time. A Notification of Readers form must be signed by the DGS and submitted to the Graduate School for approval by the Associate Dean either before the thesis is submitted or it must accompany the dissertation at the time of submission.

Copies of the thesis will be sent by the Graduate School to the readers, who are asked to judge the acceptability of the dissertation and to provide specific criticisms. Students, in consultation with the advisors are expected to incorporate any additional changes suggested by the readers into the Graduate School's unbound copy. After the Graduate School and the Program receive written copies of all readers' reports and the requested changes have been made, the faculty of the Microbiology Program must vote whether or not to recommend that the Graduate School confer the Ph.D. degree and the Graduate School Deans committee must vote to approve that recommendation. The student is notified by the Dean that the degree has been conferred.

3. Thesis Seminar

Each student is required to give a department seminar on his/her research. The thesis seminar is scheduled through the Graduate Program office and can occur after submission of the thesis. The seminar must be presented before the microbiology faculty approves the degree and the DGS signs the program recommendation form for conferral of the Ph.D. degree, which usually occurs in mid April.

When material is published from dissertation research, the Graduate School requires that it include a statement saying that the paper is taken from (or based on): "a dissertation submitted to fulfill in part the requirements for the degree of Doctor of Philosophy in Yale University".

A published manuscript can be included as a chapter in a submitted thesis. Please carefully indicate the contributions of co-authors to the performed work.

Where a student has been supported by a training grant, regulations require that the following statement be included in publications: "This investigation was supported by National Research Service Award (number of the training grant) from the NIH (awarding unit)".

The Graduate Program office can supply the relevant grant information. If a student has received other grants (for example, Howard Hughes, Bayer, NSF), these should be acknowledged, as should any financial aid received from faculty research grants.

5. Starting Postdoctoral Positions.

Students frequently start postdoctoral positions before the degree has been formally awarded. In such cases, most institutions require a letter from an appropriate University official, such as the registrar, DGS, or Department Chairman, which certifies that the student has satisfactorily completed the requirements for the degree. However, such a letter cannot be written until the readers’ evaluation of the thesis has been received.

D. Master's Degree

M.Phil. - The Master of Philosophy degree can be awarded to Ph.D. students who have been admitted to candidacy. See the Yale University Graduate School Programs and Policies booklet.

Master of Science Degree: This degree can be granted to students who are withdrawing from the Ph.D. program. To be eligible for this degree, a student must have completed at least 4 graduate-level term courses at Yale. Students choose from a number of main courses including, but not limited to MBIO 685 (Bacterial Determinants of Pathogenesis), MBIO 685 (Molecular Mechanism of Microbial Pathogenesis) MBIO 530 (Biology of the Immune System), CBIO 602 (Molecular Cell Biology), MBIO 734 (Molecular Biology of Animal Viruses), and MBIO 680 (Molecular and Cellular Processes of Parasitic Eukaryotes). Two of these 4 courses must be related to microbiology. Students must have received at least one Honor or two High Pass. In addition, students must have received a Satisfactory grade in the following 8 courses: IBIO 601b (Fundamentals of Research – Ethics), MBIO 701a,b (Research in Progress), MBIO 702a,b (Microbiology Seminar Series), MBIO 670 (First Laboratory Rotation), MBIO 671 (Second Laboratory Rotation), and MBIO 672 (Third Laboratory Rotation).

REGISTRATION

Also see the Yale University Graduate School Programs and Policies 2019-2020.

A. General Information

All students are required by the Graduate School to register whether they are in residence, in absentia, or submitting a dissertation. An unregistered student is not permitted to use University facilities, including the libraries and the Health Service. For advanced student’s certain requirements must be fulfilled prior to early registration. These include annual thesis committee meetings and submission of Thesis Prospectus. For information about registration for new and returning students, please see the Graduate School Academic Calendar (appendix 2).

Late registration incurs a Graduate School fine and must have permission from the DGS and Associate Dean.

The Course Enrollment Form (course schedule) must be approved and signed by the DGS, therefore, it should not be filled out prior to discussion with the DGS. Any changes, i.e. course added or dropped, changed from credit to audit or
vice versa, must be reported to the Registrar by submitting a course-change form signed by the DGS. Forms are available in the Graduate Program Office or at the Graduate School.

**NB:** Please see the Graduate School Academic Calendar for deadlines for submitting course schedules and changes. Course schedules and changes submitted after the Graduate School deadlines incur late fees (see Course Enrollment Forms).

Students who have completed the four-year full-tuition requirement register by submitting a continuous registration form (CRF). Students permitted to register beyond the 6th year also submit a CRF. CRF students receive registration information from the Graduate School prior to the beginning of the academic year.

**NB:** CRF students may pick up their ID sticker from the Microbiology Graduate Program Office. CRF students who register after the Graduate School deadline also are charged a late fee.

Summer registration is also required of all students supported on Yale-administered funds and students in residence who wish to use University facilities during the period June 1 through August 31 (i.e., essentially all students in the Microbiology Graduate Program). There is no fee for summer registration if you have been registered during the preceding academic year. Information about summer registration is sent to students during the preceding spring term and summer ID stickers are available in HGS 141.

**B. Foreign Student Registration**

Foreign students must register with the Advisor from the Office of International Students and Scholars, 421 Temple St., before registering with the Program. This office also helps with visa procedures and concerns.

**C. In Absentia Registration**

A student whose program of study requires full-time study at another institution, or dissertation research on a full-time basis outside of the New Haven area, may (on recommendation of the DGS and with permission of the Dean) register in absentia. Students contemplating in absentia registration should consult with the DGS as soon as possible in order for the requisite approvals to be obtained.

**D. Leave of Absence**

A student in good standing who is current with his/her degree requirements and wishes to interrupt study temporarily for personal reasons (for example, maternity leave; financial necessity; health problems) may be granted a leave of absence with approval of the Department and the Dean.

A Ph.D. student is not eligible for leave of absence after the 4th year of study except for reasons of pregnancy, maternity or paternity care, or military service. Students contemplating taking a leave of absence should consult with the DGS as soon as possible to determine eligibility and be informed of the rules regulating leaves, and in order for the requisite approvals to be obtained. See the Yale University Graduate School Programs and Policies booklet.

**E. Residence Requirement, Six-Year Limit**

Each student must be registered in New Haven for at least three (3) academic years. Any exception to the residence requirement must be approved by the DGS and the Graduate School Associate Dean. At the other extreme, the Graduate School sets a six-year limit for completion of the Ph.D. A student who has not completed all degree requirements at the end of six years must petition the Graduate School for an extension of his/her terminal date. This is done through the DGS; forms are available in the Graduate Program office.

**F. Vacation Policy**

Students making satisfactory progress toward the completion of their Ph.D. degree will have two weeks vacation in addition to the stated University holidays and the break from Christmas Eve through New Year’s Day. Additional vacation time will require permission from the thesis advisor.

**Tuition and Financial Aid**

Also see the Yale University Graduate School Programs and Policies 2019-2020.

**A. Tuition**
With rare exceptions, all Ph.D. students are charged full tuition for four years (eight terms). In essentially all cases, tuition for graduate students in Microbiology is paid by NIH NRSA institutional training grants, individual predoctoral awards from various agencies such as NSF, or by the School of Medicine, the Department, supplemented with Yale fellowships. Tuition for advanced students is paid by advisors' research grants.

After four years of tuition have been paid, the student is expected to continue registering until the dissertation is submitted or the terminal date is passed. The fee for continuous registration (CRF) is generally paid by a student's thesis advisor.

B. Financial Aid

The Department of Microbiology attempts to ensure that all students registered in its Ph.D. program are provided with adequate financial aid. Because financial aid is budgeted on a year-by-year basis, it is not possible to guarantee any particular level of financial aid in subsequent years. However, it is our expectation that graduate students in the Department of Microbiology will be supported in the years to come at least at the level described below.

1. Sources of Support & Taxation

For the 2019-2020 academic year, tuition ($43,300/AY) or CRF ($1,350/AY) will be paid for all students. In addition, a stipend of $36,550 will be paid over 12 months. All stipends are considered taxable income and students are expected to file a tax return with the IRS. The University will withhold tax on all research, teaching and other assistantships; on casual wages paid; and on the fellowship stipends of foreign students. Taxes are not withheld on fellowship or traineeship stipends for U.S. citizens. For the latter, most students file quarterly estimated tax reports. NB: Withholding forms for Connecticut State and Federal taxes must be, otherwise the maximum amount will be deducted from stipend checks. All incoming students should log into Workday and complete the necessary forms. CT W4 forms must be updated annually during the month of February. Students who are on assistantships in research (ARs) should also file a Federal W4 form. Taxation of Scholarships and Fellowships, refer to IRS publications 520 Scholarships and Fellowships and 920 Explanation of the Tax Reform Act of 1986 for information on taxes. Foreign students should also refer to IRS publication 901 U.S. Tax Treaties.

a) USPHS National Research Service Awards (NRSA)

These awards (which are also called traineeships) support the great majority of students in the Program during their initial years of study. NRSA awards are awarded by the National Institutes of Health (NIH), and pay one-half to two-thirds tuition plus a partial stipend. A supplement is added by the BBS and the School of Medicine to bring the total tuition and stipend to the current University levels. The positions are only available to US citizens and permanent residents. Predoctoral students are supported by NRSA's for three years. Taxes are not withheld for students on NRSA's, and such students are expected to file estimated tax reports with the IRS.

b) External Fellowships

There are several fellowships administered by federal or private sources for which students may be eligible (e.g., National Science Foundation, Howard Hughes Medical Institute, Department of Defense). Announcements of these fellowships are forwarded to eligible students and posted outside the Graduate Program Office. Also, Dean Sleight's office maintains an extensive file of such fellowships. Students should be aware of the fellowships that are available and should make every effort to apply for those for which their training and background are appropriate. Being awarded a competitive individual fellowship carries with it several advantages. Stipends on such fellowships are occasionally higher than the NRSA level and funds for travel and laboratory expenses may be available, and the award will strengthen a student's curriculum vitae. If awarded a fellowship, the stipend will be supplemented by $4,000.

c) University Fellowships

These are awarded by the Graduate School, but Graduate students in Microbiology do not usually apply for University Fellowships. However, University Fellowships are provided by the Graduate School for HHMI and NSF awards to make up the difference in tuition and as an additional stipend supplement incentive (Combined Award Policy). These fellowships are administered for the academic year (September to May) and are only for the duration of the award period.

d) Research Assistantships

Federal and non-Federal research grants and contracts awarded by outside agencies to support the research projects of faculty members may contain funds for research assistantships that can be held by graduate students. Appointments as research assistants are usually only made to students who have been admitted to candidacy for the Ph.D. This is the most common source of support for advanced students, and federal taxes are withheld.
2. **How Are Stipend Checks Paid?**

The Graduate Student Payroll System (GSPS) is a semi-monthly payroll; checks are paid on the 15th and last day of each month. Students may choose to have their checks deposited directly to their banks. Forms are available in the Graduate Program Office or the Financial Aid Office of the Graduate School. Incoming students may receive a check advance at registration which is paid back by payroll deduction. Advance checks should be requested at the Graduate School Financial Aid Office. Questions about pay checks should be directed to the Administrative Assistant/Department Registrar for the Graduate Program.

3. **Loans**

For information on the various types of loans that are available to graduate students, you should consult the Financial Aid Office, HGS 127; 203.432.2737. This office can provide short-term loans during temporary financial crises (for example, if a stipend check is delayed). This office also has up-to-date information on federally sponsored student loan plans.

**OTHER INFORMATION OF INTEREST**

A. **Graduate Program Steering Committee**

This Committee is comprised of faculty and students appointed by the Executive Board of the Program and oversees various aspects of the graduate program in Microbiology. Students with general concerns about the graduate program or suggestions for improvement should contact the DGS or a member of the Steering Committee.

B. **Grievance Procedures**

A situation can arise where you disagree with a decision made about you, or where you feel you have been treated wrongly by someone in the University. There are several courses of action open to you. You may ask a faculty member, the DGS, the Director of the BBS, or a member of the Executive Board for advice or assistance. Alternatively, if the matter is one that you do not wish to raise within the Program, there are University agencies that can act for you.

The Dean of the Graduate School is the initial contact for students for cases in which a student has a complaint against a member of the Faculty of Arts and Sciences or a member of the administration. The Provost of the University (203.432.4444) governs cases against a faculty member who is not a member of the Faculty of Arts and Sciences or against an employee who is not an administrator in the Graduate School or who is not subject to discipline by the student's Dean. In addition, there is a standing committee to consider student complaints of sexual harassment. Also see the Yale University Graduate School Programs and Policies. Also see Yale University Graduate School Grievance Procedures booklet which all students receive at the start of the academic year.

C. **Conduct of Research**

If you believe you have identified a potential case of scientific misconduct, there are a number of steps you should take to resolve the matter. First, you should informally discuss the matter with a faculty member you know, such as your thesis advisor or member of your thesis committee. Such discussions may help define the problem, put it in perspective, and help you decide whether further steps are warranted.

If you believe the matter requires official notice, the next level of discussion is at the departmental level, involving either the Director of Graduate Studies, or a member of the Executive Board. The program takes these matters seriously and will not penalize an individual for raising reasonable concerns. All steps will be taken to preserve confidentiality to safeguard all parties involved in the dispute.

If the matter is not satisfactorily resolved at the program level, the following individuals in the School of Medicine have an interest and experience with dealing with such problems and may be a good source of advice and help:

- **Dr. Sara Rockwell** (203.785.2963)
  Associate Dean for Scientific Affairs, 213 HRT

- **Dr. Merle Waxman** (203.785.4680)
  Ombudsperson, L-202 SHM
Finally, if the matter is not satisfactorily resolved, you should contact the Deputy Dean for Faculty Affairs (basic science departments), Dr. Michael C. Crair at 55 Park St., Rm 218 or 203.688.2286.

D.1. Graduate Student Policies

Students are reminded that the policies of the Graduate School must be followed. Any questions regarding these policies should be addressed to your assistant or associate dean.

The link to the Policies webpage is here: http://www.yale.edu/printer/bulletin/htmlfiles/grad/index.html
The link to the Programs & Policies handbook is here: http://gsas.yale.edu/academics/programs-policies

D.2. Graduate Student Representation

Assembly of Graduate Students: Students in the Graduate School of Arts and Sciences have their own student legislative body as a forum for dealing with issues across the School, for providing student representation on University and Graduate School committees, and for consultation with administrators. The Assembly is based on a proportional representation model, with student representatives selected by their individual departments or degree programs. Each department or program in the Graduate School has at least one student representative, with further representatives allotted proportionally by size of the student population. For comprehensive and up-to-date information on the Assembly, please visit their web page at http://gsa.yale.edu

E. Science Education Outreach Program

For the past several years, Yale Medical School has successfully sponsored a Science Education Outreach Program. This program is comprised of a faculty member, graduate students and postdoctoral fellows working together in bringing hands-on science to school children in the New Haven area. Their purpose is to encourage students, especially from a minority background, to enter the fields of science and medicine. Graduate students can receive information concerning this program from Professor Paula Kavathas [Genetics and Immunobiology Departments]. Graduate students wishing to share their interests and talents should contact her (203.785.6223).

F. McDougal Graduate Student Center

The McDougal Center is a Graduate Space AND five collaborating Program Offices serving GSAS Graduate School students and their families. Created in 1997 through a generous gift from the late Alfred McDougal ’53 and his wife Nancy Lauter, its mission extends beyond the Graduate School throughout Yale and New Haven. The McDougal Center is a special place for graduate students and a collection of grad student-focused service offices. The McDougal Center can help you make the most of your life inside and outside of the classroom, library, and lab at Yale.

The McDougal Graduate Student Center is housed in renovated space at 135 Prospect Street (Founders Hall, corner Sachem) near Hillhouse Avenue and at the base of Science Hill. The McDougal Center is the on-campus home base for Graduate School students outside the lab or library. It’s your place for many grad activities and services and hosts most major GSAS community events from Orientation to Commencement.

Yale Prox ID Card access - GSAS PhD and masters students, non-degree students, their spouses-partners and their accompanying guests welcome at the McDougal Center and its events. Other G&P students, postdocs and visitors are welcome as the guests of GSAS students. -GSAS students automatically get ProxID access to the McDougal Center when open. Tap your card at the access panels by any door.

Spouse/partner of GSAS Student with Yale Sponsored ID (SID) can have the student request prox card access to the Center for them using our online access request form (link is external)

Facilities - Common Room with informal space for grad socializing, study and dining; a nearby program room for events. Outdoor spaces, too.

Offices for McDougal GSL Staff and Fellows, OCS (Careers) staff, and OGSDD Diversity Fellows.

Other McDougal Center Resources for grad students
Conveniently located on the Blue, Red, and Orange Yale Shuttle lines (135 Prospect or 130 Prospect stops) and across from the Food Trucks at the Whale.

The Center has a Director, Lisa Brandes, who oversees the development of the Center and its programs, an administrative staff and a group of student McDougal Fellows who take the lead in producing a wide array of programs. Students with questions or interest in the Center are encouraged to contact Lisa Brandes in person (Founder’s Hall 185), by phone (203.432.8895) or email (lisa.brandes@yale.edu). For more information on the McDougal Graduate Student Center, visit them on the web at http://www.yale.edu/graduateschool/mcdougal.

G. Yale Health Plan (YHP)

The Yale Health Plan is a prepaid comprehensive health care program, located at the University Health Services Center, 55 Lock Street. All Yale graduate students enrolled at least half-time are automatically members of the YHP and are eligible for ambulatory care services and use of the infirmary at no additional charge. For entering students, membership in YHP begins on the day of registration. Yale requires that students have hospitalization coverage as well. For the 2019-2020 academic year this coverage will cost $2,450 and will be included as part of the regular financial aid.

YHP prescription/supplemental benefit plan that extends the basic benefits is also included in the financial aid package. Hospitalization and the prescription/supplemental benefit plan are automatically assigned to students and if not wanted must be waived. Waiver forms are available at the YUHSC.

Students may enroll their spouses and dependents under age 19 by filing an application with the YHP. A fee is applied through the Bursar's Office. Only those spouses and dependents enrolled are eligible to receive YHP benefits and service.

Members of the YHP use the University Health Services for both routine and emergency outpatient care. The YHP encourages its members to select a personal physician from its full-time primary care medical staff. Appointments are scheduled weekdays between 8:30 a.m. and 5:00 p.m. Emergency care is available 24 hours a day. In addition to primary care and emergency care, a full range of specialty services are available, including Allergy, Dermatology, General Surgery, Mental Hygiene, Neurology, Obstetrics and Gynecology, Ophthalmology, Optometry, Orthopedic Surgery, Otolaryngology and Urology.

For further information about the Yale Health Plan please call or visit the Yale University Health Services Center, subscriber services office at 55 Lock Street (203.432.0312) or visit http://yalehealth.yale.edu/.

H. Security

All members of the Yale community are alerted to the fact that Yale is not immune to crime, property loss or even personal injury. Individuals are urged to walk in groups, or request to be escorted by the Student Patrol Escort Service which has been set up by the University Police to provide for safety on the streets and in the parking lots. These students are easily identified by their orange vests and police radios. Call 203.432-WALK (203.432-6330).

Night-time transportation is available via the Minibus, free of charge with a valid ID, for students working late in the evenings. From 6:00 p.m. to 1:00 a.m. board the Minibus at one of the scheduled route pick-up stops. From 1:00 a.m. to 7:30 a.m. call 432-6330. See Minibus schedule.

A brief outline of Security Services & Policies in the Medical Area and a booklet and flyers on security are available at the SHM Rotunda or at the Security Office, room IE41 SHM (203.785.5555).

I. Photo ID/Composite Student Picture

All new incoming students will receive a photo ID at registration. Information on student IDs is included in registration packets. Lost/stolen IDs will be replaced at a cost of $25 payable by the student.

The Microbiology Program does a composite of student photos in early September. Each new student should provide the Registrar with a photo for the composite.

J. Keys and ID Access
Keys are issued to students by the business office of the department of the advisor in whose laboratory they are rotating. In general, for laboratory rotations at the Boyer Center of Molecular Medicine keys are issued through the BCMM business office; for laboratory rotations at Kline through the Biology Department business office, and for laboratory rotations at BASS through the MB&B business office.

In the Medical School we have switched over from key access to photo ID access for all entryways. ID access to the Medical School, the Boyer Center for Molecular Medicine, Hope/Brady Bridge Door, Child Study Center Door, Yale-New Haven Hospital Bridge Door is arranged for incoming students prior to their arrival by the Graduate Program Office or the Medical School Security Office. ID access to Kline, BASS, or OML must be arranged through the main campus security office.

K. Student Parking

Daily parking is available at the Medical School at Bursar-billable, monthly rates. Limited off-peak parking is available free of charge to students. Information and applications are available in the Medical School Parking Office, CE-1 SHM (http://to.yale.edu/student-parking).

24-hour parking is available on campus at Pierson-Sage Garage at Bursar-billable monthly rates. Applications are available at the Central Parking Office, 155 Whitney Avenue.

L. E-mail and Internet Access

Students automatically receive an email account. This information is sent to you during the summer by the Office of Student Financial and Administrative Services. Net IDs control access to Yale’s email servers, various internet features, other computer hosts, and the student information system web page. Before you can use these services, you must activate your net ID. If you did not receive this information, please see John Alvaro in the BBS office after registration.

For assistance with off campus internet please visit http://its.yale.edu/ or call 203.432.9000.

M. Photocopying

The Medical Library and Kline Science Library have photocopying machines that can be used on either a cash or charge basis. To charge, a student must have a Medical Library Copy Card or valid (PTAE) number. First year students can charge limited amounts of photocopying; for information, see the program's Registrar. Advanced students are expected to use their research advisor's account.

A copying machine is available in BCMM Room 344. Codes for using this machine for first year students are available from the Registrar. Advanced students are expected to use their advisor's account to purchase copy cards. Copying of non-library materials can be done very inexpensively by the Medical School Copy Center. To use this facility, you will need either a valid (PTAE) number or cash.

N. Mail

The program mailroom is in BCMM 336. Advanced students may also receive mail in their departmental mailroom. Outgoing mail must have a return address and should be placed in the trays marked "Campus" "U.S." or "Foreign" (Personal mail may be placed in the trays if it is stamped).
APPENDIX 1: The Qualifying Examination
The Qualifying Examination

The Qualifying Examination provides for unique opportunity for the student to read critically and in depth with various faculty members on areas relevant to the thesis topic, write and defend a qualifying proposal that is written along the thesis project. The quality of the thesis will be the higher the earlier the student becomes familiar with the relevant scientific fields. Therefore, the student is encouraged to qualify in the fall of the second year (3rd semester), shortly after joining the thesis laboratory. During the Qualifying Examination period, it is assumed that preparing for the examination will be essentially a full-time activity. If you are working in a laboratory, experiments may stop altogether during the reading period. Ideally, the student has fulfilled the four courses and two Honor requirements before qualifying, and not be enrolled in courses. In addition, the Qualifying Examination serves as an opportunity for the faculty to evaluate our students before their admission to candidacy for the Ph.D. degree. The qualifying exam is written directly on the thesis project and can be used as the de facto prospectus a year later for the student to be admitted to candidacy if the thesis project does not change.

Evaluation of the Student

At the completion of the qualifying exam, students are expected to possess a working knowledge of three different topics including and relating to their thesis on which they will read with faculty. They will write a “Qualifying Proposal” that outlines the thesis project. The qualifying proposal will be evaluated on the originality, rationale and approaches of the proposal. In addition to this, students will be assessed for their working knowledge of the in-depth details of the approach, including techniques, expected results, alternative approaches, and the significance of those results.

Pre-Qualifying Examination Committee Meeting

The student should discuss the organization of their Qualifying Examination early on with their thesis advisor. The advisor and the student should identify areas that are directly related to the thesis project in which the student should achieve an in depth working knowledge. The student and advisor should also identify faculty that would be appropriate members of the Qualifying Exam committee. Since the Qualifying Examination will be on the thesis project, faculty members of the Qualifying Exam committee are likely candidates of the later Thesis Committee. The DGS is available for consultation in choosing topics and committee members. Once possible topics and members of the Qualifying Committee have been identified, the student should send a brief message to the DGS with the names of the committee, the topic of the “QUALIFYING PROPOSAL”, the reading topics, and the date of the pre-qualifying exam committee meeting. At least 4 weeks in advance of the proposed start of the reading period, the student should have a committee meeting of the qualifying exam committee and the thesis advisor. The 4-week period is viewed as important, in that it gives the student a chance to clearly focus their reading and proposal topics well in advance of the beginning of the reading period; this 4-week period will be enforced by the DGS. The student should make a list of the courses taken at Yale, along with the grades, to be handed out to the faculty members at this meeting so that the faculty is aware of the strengths and possible deficiencies of the student. The faculty may request that the student take additional courses that would be beneficial to the development of the thesis. The student should also provide each of the committee members with a copy of this appendix available as a Word document from the registrar. This insures that all members fully understand the process and testing criteria. The purpose of this meeting is to provide guidance to the student on the topics to be discussed during the reading period and on the topic of the “QUALIFYING PROPOSAL”. Faculty members are encouraged to suggest reading and/or proposal topics that would be most beneficial to the long-term goals of the student. During the meeting, it is anticipated that the proposal topic and reading topics will become more focused. In discussion with the committee members, faculty will be assigned to individual reading topics. One faculty member will be identified who is willing to act as a mentor for the writing of the qualifying proposal. After the meeting, the student should prepare an outline, one-page total, summarizing the topic of the proposal, the three reading topics and assigned faculty members. The DGS, in consultation with the student, decides whether this outline is reasonable in scope, and designates one as chairman of the committee. At least one of the faculty members of the committee, including the chairman, must be a member of the Microbiology Program. The student’s thesis advisor is expected to take part in the final examining committee but cannot answer on the student’s behalf.

Reading Topics

All reading topics should be relevant to the thesis project. The Microbiology Program is currently comprised of faculty within the areas of virology, parasitology, pathogenesis, host-pathogen interaction, immunology, molecular and structural microbiology, and vector biology. When choosing reading topics, students should consider the expertise of
the faculty, so that appropriate and knowledgeable faculty members can be chosen for service on the qualifying exam committee. The final reading list (in Excel or Word format) should be sent to and approved by the qualifying committee.

**Reading Period (4 weeks)**

The Program views the Qualifying Examination as requiring the full-time attention of each student. Students are therefore exempt from laboratory and classroom activity during the entire period of the Exam. Students should inform their advisors of the dates of the reading period and examination.

The reading period should not exceed 4 weeks, although this can be expanded to fit individual readers’ schedules with the approval of the DGS. During the reading period, the student is urged to consult with members of the examining committee, the thesis advisor and others to discuss the areas being reviewed and to get advice about reading. Usually, the student would meet for one hour per week or biweekly for two hours with each faculty reader to discuss and critically evaluate specific scientific papers, and to agree on the reading material for the next meeting. The numbers of papers to be covered during each hourly session should be agreed upon by the faculty member and the student. However, it is unlikely that an in-depth discussion of several papers can occur within one hour, and the student and faculty member should keep this in mind. Students and faculty should concentrate on original papers, but faculty should advise the student on appropriate background reading, including reviews and methods papers. Students should prepare themselves to discuss the agreed upon papers with the faculty member not only by reading the chosen papers, but by being familiar with all of the background material.

**The Qualifying Exam Committee**

The qualifying exam committee will consist of three members. At least one of the faculty members of the committee, including the chairman, must be a member of the Microbiology Program. The student’s thesis advisor is expected to take part in the examining committee but cannot answer on the student’s behalf. One of the three members of the committee will assist the student in the writing of the “QUALIFYING PROPOSAL”. The major responsibility of this committee member is to assist with grantsmanship and presentation aspects of the proposal and serve mainly as editor. This faculty member is not to comment on the substance of the proposal. The other responsibility of this member will be to assist the student in comprehending the area on which the “QUALIFYING PROPOSAL” will be written, by helping to direct the reading of the student and discussing key papers with the student. Thus, in the beginning of the reading period, the faculty member and the student will concentrate on reading within the area of the “QUALIFYING PROPOSAL”, and towards the end of the reading period and during the writing period, they will concentrate on the writing of the “QUALIFYING PROPOSAL”. The faculty member will edit the proposal and discuss possible organizational and presentation changes with the student. The two other members of the qualifying exam committee will suggest papers in consultation with the student and will discuss these papers in detail with the student at weekly meetings during the reading period. Students will prepare and distribute to members of the committee a list of the papers read during the reading period.

**Writing period (2 weeks)**

At the end of the writing period, the student will hand in one research proposal, the “QUALIFYING PROPOSAL” that is written on the thesis project. The student defines the aims of the thesis project and the experimental plan. The student may consult committee members, other faculty members, postdocs, and students about the technical aspects of the proposal. Note that the main Aims and the general experimental approach should be discussed with the thesis advisor. Each proposal should be between 12 and 20 pages and should concisely review the pertinent background information, logically and clearly state the questions being attacked, and lay out an experimental plan according to the following outline:

**Specific Aims** (1 page or less). This should comprise a concise statement of the general problem under study, state the hypothesis, or hypotheses, to be tested and list the Specific Aims.

**Background and Significance** (no more than 3 pages). This section should place the experiments in context and describe the system in a manner intelligible to a non-specialist. This should include a critical evaluation of the relevant literature and a description of how this project will advance knowledge in the field.
**Experimental Plan.** Outline the experiments envisioned at this time and indicate how they will help you attain the overall goals of the project. Acknowledge pitfalls and limitations of your experimental approach, and if possible suggest alternative strategies. Suggest possible results and how they would be interpreted.

**References and Figures.** Abbreviated citations to relevant literature should be included in the text, and full citations gathered in a bibliography at the end of the proposal. These should be pertinent and need not be an exhaustive list. If necessary, up to four pages of diagrams, figures and/or tables can be included. These four pages and the bibliography will be excluded from the twenty-page limit.

The *Specific Aims, Background & Significance*, and *Experimental Plan* should be double-spaced and use a font of no less than 12 points. It is very important that you present your proposals in a clear and logical fashion. The committee will judge the proposal on the basis of logic, feasibility and originality.

**Oral Examination**

The time and place for the oral examination should be scheduled by the first week of the reading period and should be reported to the DGS. The “QUALIFYING PROPOSAL” and the list of papers read during the reading period on each topic should be distributed to the committee members one week in advance of the oral examination.

The student will prepare a short talk for the proposal. The talk should be planned to last about 30 minutes, although actual presentations will usually take longer, since faculty are likely to interrupt with questions. The committee is also encouraged to ask questions based on other material covered during the reading period. This is why it is important that they are given a list of the papers read during the reading period; this list should be given to faculty along with the “QUALIFYING PROPOSAL”, at least a week in advance of the oral examination. Students are strongly encouraged to practice the oral exam with students and postdoctoral fellows from their lab.

**Role of thesis advisor**

Since the thesis is written on the thesis project, the main Aims and the experimental approach should be discussed with the advisor and have his/her approval. Beyond the big picture and the general direction, the QUALIFYING PROPOSAL should represent the independent work of the student. During the oral exam, the advisor is expected to be present, but cannot answer questions for the student. The advisor will also receive a copy of the “QUALIFYING PROPOSAL” and of the chairman’s report after the examination has concluded. Before the oral examination, the thesis advisor should submit to the exam committee chair a written evaluation of the student’s progress in the lab.

**Evaluation**

Based on the student's performance on the examination, the committee decides whether the student should receive a:

**Pass** - the student did well during the reading period and obtained a working knowledge of the topics that were studied; wrote an original thesis proposal that was logical in its presentation and demonstrated in depth knowledge of a field relevant to the thesis and satisfactorily defended the “QUALIFYING PROPOSAL”. Note, if the thesis project doesn’t change significantly, the approved proposal can be submitted as the Prospectus a year later.

**Conditional pass** (One time only) - there were deficiencies in literature proficiency, the written proposal or the oral defense of the proposal. Possible remedies (to be specified by the examination committee) include additional reading, taking an additional course, revisions to the written “QUALIFYING PROPOSAL” or a repeated oral examination.

**Fail** – (one time only) the student’s grasp of the literature and defense of the “QUALIFYING PROPOSAL” were unsatisfactory.

At the end of the oral examination, the committee will meet with the student to transmit specific advice and recommendations. Students are also encouraged to meet individually with committee members to receive more explicit feedback regarding their proposals. A written summary of the Qualifying Examination evaluation will be prepared by the examination committee chair and submitted to the DGS. This will include the thesis advisor’s evaluation. Significant problems in both laboratory work and the Qualifying Examination may be grounds for action by the DGS. The final decision to admit to candidacy is by vote of the Executive Committee of the Program, who will take into consideration the student's overall academic record as well as his or her performance on the examination.
Timing of the examination

Students are encouraged to complete their four course and two honor requirements in the first two semesters so that they can take the Qualifying Examination in their third semester. If too many course requirements haven’t been met, or the student is enrolled in dual tracks with an increased course load, student, advisor and DGS can agree that the Qualifying Examination is postponed to the fourth semester. The written and oral examination must be completed by the end of the second year.

A typical timeline for the exam is:

Week
-6 (but most likely much earlier) meet with thesis advisor to identify reading and proposal topics and send
-4 have a pre-qualifying examination and hand in one-page outline to DGS for approval.
-1 meet with faculty readers to decide on reading list for first week
1 to 4 meet weekly or biweekly with the three faculty readers
5 to 6 write proposal
end of 6 hand in proposal and list of papers read to committee
by end of 7 oral examination

brief note to DGS covering possible topics and the date of the pre-qualifying exam meeting.
Schedule of Academic Dates and Deadlines 2019-2020

Fall Term 2019

August 19
New student Orientation Week begins.
Oral Performance Assessment for international students in Ph.D. programs.

August 21
Fall Term Online Course Selection (OCS) begins.

August 22
Matriculation ceremony.

August 26
Teaching @ Yale Day: Orientation for all new teaching fellows.

August 28
Fall Term classes begin, 8:20 am.

August 30
Monday classes meet Friday

September 2
Labor Day; classes do not meet.

September 6
Final day to apply for a Fall Term personal leave of absence.
The entire Fall Term tuition charge or continuous registration fee (CRF) will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a leave of absence effective on or before this date.

September 11
Fall Term Online Course Selection (OCS) ends.
Final day for registration. A fee of $50 is assessed for course schedules accepted after this date.

September 16
Due date to notify Department of intention to submit dissertation for award of the Ph.D. in December.
Final day to file petitions for degrees to be awarded in December (MA, MS, MPhil)

September 20
One-half of the Fall Term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. The CRF is not prorated.

October 1
Due date for dissertations to be considered by the Degree Committees for award of the Ph.D. in December.
Final date for the faculty to submit grades to replace grades of Temporary Incomplete (TI) awarded during the previous academic year.

October 15
October Recess begins.

October 21
Classes resume.

October 25
Final Day to withdraw from a fall-term course.
Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit. 

Midterm
One-quarter of the Fall Term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. The CRF is not prorated.
Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.

November 1
Readers’ Reports due for dissertations to be considered by the Degree Committees for award of the Ph.D. in December.

November 6
Final day to withdraw a degree petition for degrees to be awarded in December.

November 7
Oral Proficiency Assessment for international students in all GSAS degree programs.

November 15
Deadline for departments to return Degree Recommendation Forms for December degrees to registrar

November 22
November Recess begins, 5:30 pm.

December 2
Classes resume, 8:20 am.
Final day to submit petitions for extended registration and Dissertation Completion status for the Spring Term.

December 12
Classes end, 5:20 pm.

December 13
Final Examinations begins, 9:00 am

December 18
Examinations end, 5:30 pm; Winter Recess begins.

December 19
Date of December degree award

Spring Term 2020

January 2
Final grades for Fall Term courses due.

January 8
Spring Term Online Course Selection (OCS) begins.

January 10
Teaching @ Yale Day: orientation for all new Teaching Fellows.

January 13
Spring Term classes begin, 8:20 am.

January 17
Monday classes meet on Friday
January 20
Martin Luther King, Jr. Day. Classes do not meet.

January 23
Final day to apply for a spring-term personal leave of absence.
The entire Spring Term tuition charge or CRF will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a leave of absence effective on or before this date.

January 24
Registration ends. A fee of $50 is assessed for course schedules accepted after this date.
Spring Term Online Course Selection (OCS) ends.

February 7
One-half of the Spring Term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. The CRF is not prorated.

February 14
Due date to notify department of intention to submit dissertation for award of the Ph.D. in May.

March 2
Final day to file petitions for degrees to be awarded in December (MA, MS, MPhil)

March 6
Midterm
Spring Recess begins, 5:20 pm.
One-quarter of the Spring Term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. The CRF is not prorated.
Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.
Final day to change enrollment in a Spring Term course from Credit to Audit or from Audit to Credit.
Final day to withdraw from a Spring Term course.

March 16
Due date for dissertations to be considered by the Committees for award of the Ph.D. in May.
Final day to file petitions for degrees to be awarded in May.

March 23
Classes resume, 8:20 am.

April 15
Readers’ Reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in May.
Oral Proficiency Assessment for international students in all GSAS degree programs.

April 17
Departmental recommendations are due for candidates for May degrees.
Final day to withdraw a degree petition for degrees to be awarded in May.

April 30
Classes end, 5:30 p.m.

May 1
Final day to submit Dissertation Progress Reports.

May 6
Final Examinations begin.
May 8
Final grades for Spring Term courses are due for candidates for terminal M.A. and M.S. degrees to be awarded at Commencement.

May 17
Graduate School Convocation.

May 18
Date of May degree award
University Commencement.

May 29
Final grades for Spring Term courses and full-year courses are due.

June 1
Final day to submit petitions for extended registration and Dissertation Completion status for the subsequent academic year.

A Detailed list of events can be found at http://gsas.yale.edu/academic-events
APPENDIX 3: The Prospectus
The Dissertation Prospectus

At the end of the third year, the Graduate School requires each student to submit a tentative written summary of the nature and scope of the dissertation research, together with a provisional title for the dissertation, known as the Dissertation Prospectus. Microbiology students may submit the written portion of their Qualifying Examination, with a few minor additions, as their Prospectus. If the Aims of the project have considerably changed, an updated document is necessary. This document should be written in clear, plain English with minimal jargon, abbreviations, or colloquialisms, and adhere to the following format:

1. Specific Aims (1 page or less): A concise statement of the general problem under study and the explicit goals of the project.
2. Background and Significance (no more than 3 pages): This section should place the experiments in context and describe the system in a manner intelligible to a non-specialist. This should include a brief, but critical, evaluation of the relevant literature and a description of how your research project will advance knowledge in the field.
3. Progress to date (2-3 pages): Description of the experiments you have already carried out and your interpretation of the data generated.
4. Proposed Research Plan (3-4 pages): Outline the experiments envisioned at this time and indicate how they will help you attain the overall goals of the project. Acknowledge pitfalls and limitations of your experimental approach, and if possible suggest alternative strategies.
5. References: Should be included at the end [not counted in the page limit]. If you wish, you can also include up to two additional pages of diagrams, figures or tables, with appropriate brief legends, as long as these are referred to in the text.

Because the Prospectus is required fairly early in the dissertation research, the content of a thesis may change over time, and the student should not feel bound by what is submitted. The Prospectus must be submitted to the DGS by the advisor together with a note indicating that it has been approved by the thesis committee. The DGS may require additional changes. Once the DGS has approved the Prospectus, it will be submitted to the Graduate School Registrar. If substantial changes are made to the student’s thesis project after the Qualifying Examination, an updated Prospectus should be submitted and approved by thesis committee and thesis advisor, then submitted to the DGS prior to admission to candidacy.

Admission to Candidacy

After all pre-dissertation requirements are successfully completed (Course requirements, Honors requirement, Qualifying Examination, Dissertation Prospectus, positive evaluation on laboratory work at the first thesis committee meeting after the qualifying exam), a student will be admitted to candidacy for the Ph.D. degree. These requirements are normally met in three years. A student who has not been admitted to candidacy will not be permitted to register for the fourth year. Exceptions must be approved in advance by the DGS, the Program Executive Committee, and the Graduate School Associate Dean. In the Microbiology Program, students can petition for the M.Phil. degree in the semester following admission to candidacy for the Ph.D. degree.
APPENDIX 4: Course Schedules
(Annual Courses)
**Microbiology Courses**  
*Web site for other courses at Yale:*  http://students.yale.edu/oci/search.jsp

**Fall**

**MBIO530/MCDB 530/IBIO 530, Biology of the Immune System**  
The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens. Immunologic memory and vaccines. Human diseases including allergy, autoimmunity, cancer, immunodeficiency, HIV/AIDS.

**MBIO561/MCDB 561 Introduction to Dynamical Systems in Biology**  
Study of the analytic and computational skills needed to model genetic networks and protein signaling pathways. Review of basic biochemical concepts including chemical reactions, ligand binding to receptors, cooperativity, and Michaelis-Menten enzyme kinetics. Deep exploration of biological systems including: kinetics of RNA and protein synthesis and degradation; transcription activators and repressors; lysogeny/lysis switch of lambda phage and the roles of cooperativity and feedback; network motifs such as feed-forward networks and how they shape response dynamics; cell signaling, MAP kinase networks and cell fate decisions; bacterial chemotaxis; and noise in gene expression and phenotypic variability. Students learn to model using MATLAB in a series of in-class hackathons that illustrate biological examples discussed in lectures.

**MBIO 670 Laboratory Rotation**  
Rotation in three laboratories. Required for all first-year graduate students.

**MBIO 686, The Biology of Bacterial Pathogens Part I**  
The course provides an introduction to basic principles in bacterial pathogenesis. Topics focus on the bacterial determinants mediating infection and pathogenesis, as well as strategies to prevent and treat diseases. Each week a lecture is given on the topic, followed by student presentations of seminal papers in the field. All participants are required to present a paper.

**MBIO 701 Research in Progress (RIP)**  
All students, beginning in their third year, are required to present their research once a year at the Graduate Student Research in Progress. These presentations are intended to give each student practice in presenting his or her own work before a sympathetic but critical audience and to familiarize the faculty with the research. If the student’s committee has approved (or is almost certain to approve within the next few months) of a student’s thesis defense, the student’s mentor will be required to decide if it is necessary for the student be present a RIP or not.

**MBIO 703, Microbiology Seminar Series**  
All students are required to attend all Microbiology seminars scheduled throughout the academic year. Microbiologists from around the world are invited to describe their research.
Spring

**MBIO 601 Fundamentals of Research: Responsible Conduct of Research**
A weekly seminar presented by faculty trainers on topics relating to proper conduct of research. Required of first-year Immunobiology students, first-year CB&B students, and training grant-funded postdocs. Pass/Fail.

**MBIO 671 Laboratory Rotation**
Rotation in three laboratories. Required for all first-year graduate students.

**MBIO 672 Laboratory Rotation**
Rotation in three laboratories. Required for all first-year graduate students.

**MBIO 680/EMD 680, Molecular and Cellular Processes of Parasitic Eukaryotes**
An introductory topic-based course in modern parasitology. For each topic there is an introductory lecture followed by a journal club-like discussion session of relevant papers selected from the literature. The course provides an introduction to basic biological concepts of parasitic eukaryotes causing diseases in humans. Topics include strategies used by parasitic eukaryotes to establish infections in the host and approaches to disease control, through either chemotherapy, vaccines, or genomics. In addition, emphasis is placed on evaluating the quality and limitation of scientific publications and developing skills in scientific communication. Prerequisite: permission of the instructor.

**MBIO 685, Biology of Bacterial Pathogens II**
This interdisciplinary course focuses on current topics related to host-pathogen interactions. Each week a lecture is given on the topic, followed by student presentations of seminal papers in the field. All participants are required to present a paper.

**MBIO 700, Seminal Papers on the Foundations of Modern Microbiology**
A required course for Microbiology first- and second-year students; not for credit. The course is offered every other year, alternating with MBIO 703a, so that it can be taken once during each student's tenure in the program. Students present and discuss papers describing fundamental discoveries in areas related to microbiology. The goal is to familiarize students with the process of scientific discovery, and with the history of major developments in the field. Topics include important discoveries involving major human pathogens, fundamental processes in molecular biology, and the development of technology that has a major impact on current biomedical research.

**MBIO 702 Research in Progress**
All students, beginning in their third year, are required to present their research once a year at the Graduate Student Research in Progress. These presentations are intended to give each student practice in presenting his or her own work before a sympathetic but critical audience and to familiarize the faculty with the research. If the student’s committee has approved (or is almost certain to approve within the next few months) of a student’s thesis defense, the student’s mentor will be required to decide if it is necessary for the student be present a RIP or not.

**MBIO 704, Microbiology Seminar Series**
All students are required to attend all Microbiology seminars scheduled throughout the academic year. Microbiologists from around the world are invited to describe their research.

**MBIO 705, Evasion of Host Defense by Viruses, Bacteria and Eukaryotic Parasites**
The course, in student seminar format, is required for all first and second year Microbiology Graduate Program students. Subjects to be discussed include strategies employed by viruses, bacteria or eukaryotic parasites to evade either cell intrinsic defenses, such as programmed cell death or innate immune sensing, or responses operating at the level of the organism, such as the adaptive immune response. Often every other year

**MBIO 734/GENE 734/MB&B 734, Molecular Biology of Animal Viruses**
Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. Often every other year