

**IOWA STATE UNIVERSITY**  
Interdepartmental Microbiology Graduate Program

# **The Microbiology Graduate Student Handbook**

**2018-2019**

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# INTRODUCTION

## ***Message from the Chair***

As a graduate student in the Interdepartmental Microbiology (IM) program, you have access to a wide range of opportunities to build your career as a microbiologist. I encourage you to take advantage of these opportunities. Challenge yourself, your fellow students and the faculty to push beyond the boundaries of our current knowledge! Do this in all avenues of your education – in courses, in the lab, at journal clubs, workshops, seminars, and professional meetings - and you will find your graduate experience to be richly rewarding. The faculty in the IM program endeavor to provide the range of opportunities necessary for scientific development, but your initiative in actively and creatively pursuing knowledge is the key to your education.

This handbook is designed to provide guidance on the policies and procedures of the IM program. Like our scientific knowledge, graduate programs evolve and change and these changes are driven by the efforts and ingenuity of people. I encourage you to talk with your major professor to keep abreast of policy changes that have been instituted since the printing of this handbook, as well as to provide your ideas for program improvement to the Chair and members of the Supervisory Committee of Microbiology at any time.

## ***Mission of the IM Program***

Microbiology is integral to global well-being through its central role in agricultural productivity, human health, environmental quality and restoration, industrial processes, and food production and safety, as well as its contribution to a basic understanding of all living systems. The mission of the Graduate Program at Iowa State University is to advance scientific discovery in microbiology by providing education and research opportunities for future microbiologists.

## ***The Microbiology Major***

The Graduate Major in Microbiology is an interdepartmental training program at Iowa State University that offers the degrees of Master of Science and Doctor of Philosophy in Microbiology, and a minor to students majoring in other programs. The IM program offers a broad range of research opportunities, including in prokaryotic and eukaryotic microbiology, virology, microbe interactions with animals, plants and arthropods, and the responses of those hosts to the microbes. Microbiology training is offered through approximately 69 faculty housed in eighteen departments: Agricultural and Biosystems Engineering; Agronomy; Animal Science; Biochemistry, Biophysics and Molecular Biology; Chemical and Biological Engineering; Civil, Construction and Environmental Engineering; Ecology, Evolution, and Organismal Biology; Entomology; Food Science and Human Nutrition; Genetics, Developmental

and Cell Biology; Geological & Atmospheric Sciences; Kinesiology; Natural Resource Ecology and Management; Plant Pathology and Microbiology; Veterinary Diagnostic and Production Animal Medicine; Veterinary Microbiology and Preventive Medicine; and Veterinary Pathology, with some of these faculty having appointments at the National Animal Disease Center or the National Laboratory for Agriculture and the Environment. Currently, faculty and students are pursuing research in many areas of microbiology, including microbial biochemistry, ecology, genetics and molecular biology; biogeochemistry; food safety and security; microbe-host interactions; bacteriology; immunology; metabolic engineering; mycology; parasitology; virology; and microbial genomics.

A major strength of the Graduate Major in Microbiology lies in the combined expertise of its diverse faculty. The large number of IM faculty in diverse areas of microbiology provides students with flexibility when choosing a research project and major professor, as well as with a spectrum of course offerings in microbiology and related disciplines. Activities, including seminars, journal clubs, and the Microbiology Graduate Student Organization (MGSO), provide opportunities for scientific and social interactions. These interactions are central to the program goal of providing broad and robust training while stimulating excellence in Microbiology research.

### **Administration**

The activities of the Interdepartmental Microbiology Graduate Program are administered by a Chair, a Supervisory Committee, and a Program Coordinator. Please feel free to contact them if you have any questions about the program. For the 2014-2015 academic year, these positions are held by the following people:

**Chair: Bryan Bellaire**, Vet Microbiology & Preventive Medicine  
1136 Vet Med, 1800 Christensen Dr., 515-294-2319  
[bbella@iastate.edu](mailto:bbella@iastate.edu)

### **Supervisory Committee:**

**Admissions: Stephan Schmitz-Esser**, Animal Science

**Curriculum: Heather Allen**, National Animal Disease Center; Vet Microbiology & Preventive Medicine

**Recruitment: Byron Brehm-Stecher**, Food Science & Human Nutrition

**Associate Chair: Bryan Bellaire**, Vet Microbiology & Preventive Medicine

**Ex-Officio Chair: Laura Jarboe**, Chemical and Biological Engineering

**Program Coordinator: Dai Nguyen** Plant Pathology and Microbiology  
207 Science I, 515-294-9052, [microbiology@iastate.edu](mailto:microbiology@iastate.edu)

## UPON ARRIVAL AT IOWA STATE

When you first arrive, you may find yourself overwhelmed by the number of things you must do. Here is a list of some of the most important.

1. Visit the Interdepartmental Microbiology Program Office in 207 Science I and introduce yourself to Dai Nguyen, the Program Coordinator. Dai can help you find your way around the University administrative offices and answer questions you have about the IM program.
2. Please e-mail Dr. Bryan Bellaire ([bbella@iastate.edu](mailto:bbella@iastate.edu)), IM Chair, to make an appointment if you have any questions about courses or rotations.
3. **Read this HANDBOOK.** It is especially important to read the section on Administrative Matters during your first few days. This handbook is available on-line at: [www.micrograd.iastate.edu](http://www.micrograd.iastate.edu)
4. Register for e-mail at Durham Hall and plan to check it regularly (at least daily). E-mail is the most common means of communication at Iowa State University.
5. Obtain the following references and examine them carefully. These documents contain all the University regulations and requirements for graduation.

### **Graduate College Handbook Graduate College Thesis Manual**

They are available on the Web through the ISU Graduate College Homepage at:  
<http://www.grad-college.iastate.edu/publications/gchandbook/homepage.html>

<http://www.grad-college.iastate.edu/current/thesis/>

Iowa State Graduate College forms are available on the Internet at:  
<http://www.grad-college.iastate.edu/forms/forms.html>

6. Other references you may wish to obtain at the ISU bookstore or on the web include:

General Catalog:  
<http://catalog.iastate.edu/>

Schedule of Classes:  
<http://classes.iastate.edu/>

Iowa State University phone/e-mail directory (contains two-year calendar of academic dates and deadlines):  
<http://info.iastate.edu/>

Other References available on the web can be located through the Iowa State University Homepage: <http://www.iastate.edu>. Note the alphabet at the top of this page; you can click through to many subject headings.

7. Other web sites of interest

Iowa State University forms are available on the Internet at:

<http://www.ats.iastate.edu/forms.html>

**ISU University-wide POLICY LIBRARY:** <http://policy.iastate.edu/>

## **GETTING STARTED - YOUR FIRST YEAR**

### ***Graduate Student Orientation***

For new graduate students, the academic year begins with an orientation period which is designed to ease the transition to graduate study at Iowa State. It is a time to become acquainted with the Interdepartmental Microbiology program and its members and to prepare for registration and the start of classes. Along with this handbook, you should have received a schedule of important orientation activities from the IM program and from the Graduate College. Please refer to them for information about your responsibilities during orientation.

Which of the following sections that you need to read is determined by how you are being funded. Students may enter Interdepartmental Microbiology by either of two routes: direct admission into IM followed by the selection of a major professor, or direct admission into the laboratory of their major professor. Students entering directly into the IM program are usually supported for their first year on a Microbiology Research Assistantship and spend their first semester (M.S.) or first year (Ph.D) doing rotations and choosing a major professor. They should read the entire handbook. Students entering directly into the laboratory of their major professor must be accepted by the department of their major professor, hereafter called their “home department”, and must arrange for support through their major professor and home department. The latter students may skip sections dealing with temporary advisors, research rotations, and choosing a major professor.

### ***Assignment of a Temporary Graduate Advisor***

If you have entered the Interdepartmental Microbiology program directly, by the time of your arrival for the orientation program, the Chair will act as your Temporary Graduate Advisor. The responsibilities of your advisor are to guide you in selecting courses during your first year, to discuss with you the research opportunities in IM, and to suggest laboratories for visits and rotations.

During the first week of the orientation period, you will meet with your advisor for counseling and preparation of your schedule for the fall semester. If it is necessary to add or drop a course, or change sections of a course or the number of credits, use an Add/Drop Slip available from the IM Office in 207 Science I.

### ***Research Rotations – Micro 697***

First year students who enter the Interdepartmental Microbiology program directly as Research Assistants are required to do laboratory rotations (MICRO 697) to help them choose their major professor. First-year students who have entered directly into the laboratory of their major professor are not required to take MICRO 697 or do rotations. Rotation among laboratories within the home department is encouraged, but such policies are determined by the department. In addition to helping you



choose a major professor, these research rotations provide an interdisciplinary research experience, give an opportunity to actively participate in the research program of the laboratories in which you are interested, and promote interaction and exchange of information among research groups.

Microbiology Research Assistants must do three full-length laboratory rotations during their first year, if you are a Ph.D. student, or two full-length laboratory rotations, if you are an M.S. student (unless otherwise noted in their offer letter). A full-length rotation is at least 6 weeks long; rotations typically last 6-8 weeks. You only need to identify one laboratory to rotate in at a time; however, it is not uncommon to set up all of the rotations near the beginning of the first semester. If you have made arrangements to do a rotation and later decide not to participate in that rotation, you must notify the faculty member of your decision as soon as possible after the decision has been made. The total number of credits of MICRO 697 per semester should be 1 to 6. After two weeks in a laboratory rotation, you are responsible for contacting your advisor to discuss how the rotation is proceeding. *If you know after two weeks that this is not the area of research you wish to pursue, you should work with your advisor and the rotation lab manager to terminate the rotation.* Students are required to participate in three full-length rotations.

### **Choosing a major professor**

If you have entered the Interdepartmental Microbiology program directly, much of your first year will be devoted to the important process of selecting a major professor. This is the person who will guide you in your graduate studies and whose research group you will join. To help you decide on professors with whom to rotate, you should make use of the following information:

- A description of the IM faculty research on the IM homepage ([www.micrograd.iastate.edu](http://www.micrograd.iastate.edu)) and on the homepages of the individual faculty (click on the "Faculty" link on the IM homepage).
- Recent publications of the IM faculty (you can often find references to these on the faculty homepages or by doing a literature search such as on the web in the Web of Science search engine [Library → Collections → Indexes and Abstracts → W → Web of Science → Go to Form0020Search → Click Last 5 years → Name [Einstein, A\*]])
- **Most important:** Discussions with individual faculty members. Faculty can provide curriculum vitae and recent publication references. Students are strongly encouraged to contact and interact with at least **six** faculty during the rotation selection process.

When you have decided with whom you would like to rotate, you need to personally ask the faculty member whether you can rotate in his or her laboratory. As part of this discussion, you will need to tell him or her about your interests and inquire whether

there might be space and funding for you after you finish your rotations. You should also discuss the project you might have for your research. If you and the faculty member agree to a rotation, you should do the following:

- Decide upon mutually acceptable dates to begin and end your rotation in the lab. If your rotation includes holidays like Thanksgiving or Christmas, you should ask about the work schedule during this time and indicate if you plan to take any vacation days.
- Discuss if there is an expectation of a presentation or short paper so you can plan for this during the rotation
- Discuss the expectations regarding your work schedule (arrival and departure times)
- Ask who your main contact will be during your rotation in the lab

During your rotations, you will conduct research but are not required to complete a project. Part of the process of choosing a lab is learning if there are any additional courses or other requirements that must be met in the home department of your chosen faculty mentor. These requirements vary with each department. On completion of each rotation, your performance will be evaluated and the faculty member will provide a written evaluation to the Chair. These evaluations will be used in the annual review of each student. You will be asked to evaluate the rotation experience in an interview with the program Chair at the end of the spring semester.

You should avoid choosing a major professor until *after* your rotations. If a faculty member attempts to get a commitment from you before the end of your rotations, you may discuss your interest in the lab, but you must state, "I can't actually commit to a lab until my third rotation is completed." Remember that as great as your present rotation may be, there is always the possibility that the next rotation will be even more interesting or promising.

After you finish all of your laboratory rotations, ask the faculty member with whom you would like to work whether he or she can accept you into his or her laboratory and arrange for your future financial support. Ask about the amount of the stipend and tuition support. These are things you need to know when deciding whether to join a specific lab. You can approach this question by indicating the present amount you receive from IM and ask if the faculty member will be able to provide the same support. Once a mutual agreement has been reached, please inform the Interdepartmental Microbiology program Chair and Program Coordinator. Students should initiate a "Request to Establish a Home Department for Students Admitted to Interdepartmental Majors" form found at [http://www.grad-college.iastate.edu/common/forms/student\\_forms.php](http://www.grad-college.iastate.edu/common/forms/student_forms.php) and bring that form to the IM administrative office.

## **DEGREE REQUIREMENTS**

### ***Degrees Offered***

Interdepartmental Microbiology (IM) offers coursework and research experiences leading to the degrees of Master of Science and Doctor of Philosophy in Microbiology, and a minor to students majoring in other programs. A Non-thesis Master of Science degree is not offered.

### ***Admissions to a Degree Program***

The degree that a student may pursue in the IM program is specified at the time of the student's admission into the program. Although a prior M.S. is not required for admission to the Ph.D. program, criteria for admission to the Ph.D. program are more stringent than to the M.S. program.

Students wishing to pursue a Ph.D. in Interdepartmental Microbiology after completing an MS in the IM program, or wishing to change the degree that they are pursuing from an M.S. to a Ph.D., must re-apply to the IM program. This application must consist of a Curriculum Vita and an unofficial copy of their transcript. Students must also arrange for memos from their POS committee members indicating support or lack of support for entry of the student into doctoral candidacy. Memos communicated by e-mail are acceptable. These materials should be submitted to the Program Coordinator of the IM program. The application will be reviewed by the Admissions Committee, with the same criteria used in evaluating other applications to the Ph.D. program. The Admissions Committee will decide on one of the following options:

1. The student may change from the M.S. to the Ph.D. program without completing the M.S.;
2. The student may pursue the Ph.D. after earning the M.S.;
3. The student is not allowed to pursue the Ph.D. in Microbiology.

### ***Required Courses***

It is expected that all graduate students entering the IM program will have a strong background in the biological sciences, including at least one semester of coursework in each general microbiology and general genetics, including exposure to molecular biology. Your Major Professor or Temporary Graduate Advisor will help you determine if you have deficiencies that should be addressed with additional background courses.

#### *The Microbiology Core Curriculum*

To assure that all IM students develop a base of fundamental principles and information essential to microbiology, all students will take a series of "core courses" in addition to courses specific to individual interests. *Students must receive a C or*

*better in each course and at least a B average over all six core courses to fulfill this requirement.* This policy applies to IM minors as well as majors.

The **Microbiology Core Curriculum** consists of:

1. Microbial diversity and phylogeny (Micro 551) 1 credit
2. Bacterial molecular genetics and physiology (Micro 552) 1 credit
3. Pathogenic microorganisms. (Micro 553) 1 credit
4. Virology. (Micro 554) 1 credit
5. Fungal Biology (Micro 555) 1 credit
6. Microbial ecology and environmental monitoring (Micro 556) 1 credit

Additional courses required of all majors:

1. Biochemistry (BBMB 404 and BBMB 405, or the equivalent)
2. Responsible Conduct of Research in Science (GR ST 565) 1 credit.

### **Course Requirements for a Doctoral Degree**

Ph.D. candidates majoring in Microbiology must take at least 72 credits; this includes credit from the Core Curriculum, other courses, and research. Requirements that must be met for the doctoral degree are the Microbiology Core Curriculum, shown above; at least 3 additional courses (*9 credits*) from an approved list of courses in the microbiological sciences, and students must receive a B or better in each course to fulfill this requirement; and enrollment and credit in the Microbiology Seminar (Micro 604) at least five times (*5 credits*). Students must also make at least two formal scientific presentations; these include presentations given in Micro 604, at scientific conferences, or during departmental or interdepartmental seminar series. Fulfillment of this requirement requires approval by the POS committee. Additional course work may be selected to satisfy research interests, expectations of the POS committee, or home department requirements.

### **Course Requirements for a Master of Science Degree**

M.S. candidates majoring in Microbiology must take at least 30 credits; this includes credit from the Core Curriculum, other courses, and research. Requirements that must be met for the Master of Science degree are the Microbiology Core Curriculum, shown above; at least 1 additional course (*3 credits*) from an approved list of courses in the microbiological sciences, and students must receive a B or better to fulfill this requirement; and enrollment and credit in the Microbiology Seminar (Micro 604) at least three times (*3 credits*). Students must also make at least one formal scientific presentation, and may be a presentation given in Micro 604, at a scientific conference, or during a departmental or interdepartmental seminar series. Fulfillment of this requirement requires approval by the POS committee. Additional course work may be selected to satisfy research interests, expectations of the POS committee, or home department requirements.

## **Course Requirements for a Minor in Microbiology**

Students can receive a Minor in Microbiology by completing the first six courses listed under the Microbiology Core Curriculum (6 credits), as well as one additional advanced course from the approved list of courses in the microbiological sciences (3 credits).

### **“Testing Out” of Required Courses**

If you feel that you already know the material covered in one or more of the required microbiology courses, you may petition to be excused from the requirement. To do this, first discuss the idea with your Temporary Graduate Advisor or major professor, your POS Committee (if you have one), and the course instructor. If they agree with your proposal, then you may submit a letter to the IM Chair requesting permission to be excused from the course requirement. The letter must include a description or documentation of your previous experience in that subject area. The IM Chair will submit the request to the IM Curriculum Committee for a decision.

A word of caution: if you are excused from a microbiology course requirement, do not forget to review the topics covered by the course prior to your preliminary or final exams. You will be expected to be as knowledgeable on this topic as all other students.

### **Transferability of Credits from other Institutions**

The transferability of credits from other institutions will be determined on a case-by-case basis by the student’s POS committee and the IM Chair. Credits for seminars, research, workshops and colloquia are not transferable.

### **Substitute core courses**

For students who are unable to take one or more of the 55X (551-556) series of classes within the first two years of enrolling in the Microbiology Graduate program, the student may petition his or her POS committee, with prior approval of the Chair, for permission to 1) if available, take a substitute course approved by the 55X course instructor (for a partial list of potential substitutions, see table below); OR 2) if the 55X instructor agrees, to carry out a directed independent study as *MICRO 590:Special Topics* for 1 or more credits under the supervision of that instructor or a substitute approved by that instructor. The directed independent study should achieve learning objectives equivalent to the Micro 55X for which it is being substituted. Additional credits from a 3 credit substitute course or from the independent study would count toward Microbiology electives. The major professor and the POS Committee, in consultation with the student, should make the decision on which option is most appropriate for the student.

The Micro 55X series of core courses were developed to provide all Microbiology Graduate students with a basic level of knowledge, sufficient for them to successfully pass the preliminary examinations. Without a minimum of five enrolled students in a given semester, graduate classes are subject to cancellation for that semester. Bearing both of these things in mind, students should make every effort to take the 55X courses. The alternatives described above should be considered only when there is an irreconcilable scheduling conflict that would delay the normal course of the student's progress toward his or her degree.

| <b>MICRO 55x course (1 credit each)</b>                    | <b>Alternative course</b>                             |
|--|---|
| MICRO 551. Microbial Diversity and Phylogeny               | MICRO 530. 3 cr. Prokaryotic Diversity and Ecology.   |
| MICRO 552. Bacterial Molecular Genetics and Physiology     | Micro 502. 3 cr. Microbial Genetics                   |
| MICRO 553. Pathogenic Microorganisms                       | Micro 625. 4 cr. Mechanisms of Bacterial Pathogenesis |
| MICRO 554. Virology  | Micro 508. 3 cr. Virology.                            |
| MICRO 555. Fungal Biology                                  |   |
| MICRO 556. Microbial Ecology and Environmental Monitoring. | Micro 585. 3 cr. Soil Microbial Ecology               |

## **APPROVED LIST OF COURSES IN THE MICROBIOLOGICAL SCIENCES**

### **MICROBIOLOGY CORE COURSES**

|           |  |        |                |
|-----------|--|--------|----------------|
| Micro 551 | Microbial Diversity and Phylogeny              | Fall   | Tom Bobik      |
| Micro 552 | Bacterial Molecular Genetics and Physiology    | Fall   | Chris Minion   |
| Micro 553 | Pathogenic Microorganisms                      | Fall   | Bryan Bellaire |
| Micro 554 | Virology                                       | Spring | Steve Whitham  |
| Micro 555 | Fungal Biology                                 | Spring | Tom Harrington |
| Micro 556 | Microbial Ecology and Environmental Monitoring | Spring | Gwyn Beattie   |

### **BACTERIOLOGY/GENETICS/PHYSIOLOGY**

|           |                                   |                          |             |
|-----------|-----------------------------------|--------------------------|-------------|
| Micro 502 | Microbial Genetics                | Alt Fall, offered 2018   | G. Phillips |
| Micro 530 | Prokaryotic Diversity and Ecology | Alt Spring, offered 2019 | T. Bobik    |
| Micro 586 | Medical Bacteriology              | Fall                     | B. Bellaire |

## **VIROLOGY**

|                  |                    |                          |                        |
|------------------|--------------------|--------------------------|------------------------|
| Micro 408        | Virology           | Fall                     | A. Miller              |
| PL P 510         | Plant Virology     | Alt Spring, offered 2019 | Allen Miller           |
| VMPM 587         | Animal Virology    |                          |                        |
| Micro (VMPM) 608 | Molecular Virology | Alt Fall, offered 2018   | C. Miller, B. Blitvich |

## **MYCOLOGY**

|           |                          |                        |            |
|-----------|--------------------------|------------------------|------------|
| Micro 456 | Principles of Mycology   | Fall                   | L. Leandro |
| PLP 543*  | Ecology and Epidemiology | Alt Fall, offered 2019 |            |

\*To be an elective.

## **ENVIRONMENTAL MICROBIOLOGY & ECOLOGY**

|           |                                     |                                       |            |
|-----------|-------------------------------------|---------------------------------------|------------|
| Micro 585 | Soil and Environmental Microbiology | Fall                                  |            |
| Micro 685 | Advanced Soil Biochemistry          | Alt Spring, Offered even-number years |            |
| Micro 587 | Microbial Ecology                   | Fall                                  | E. Swanner |

## **FOOD MICROBIOLOGY**

|           |   |                        |                   |
|-----------|---|------------------------|-------------------|
| FS HN 504 | Advanced Food Science-Microbiology                | Spring                 |                   |
| Micro 507 | Microbiological Safety of Foods of Animal Origins | Spring                 | J. Dickson        |
| Micro 626 | Advanced Food Microbiology                        | Alt Fall, offered 2019 | B. Brehm- Stecher |

## **PLANT-MICROBE INTERACTIONS**

|           |  |                          |             |
|-----------|--|--------------------------|-------------|
| PI P 506  | Plant-Pathogen Interactions                      | Alt Spring, offered 2019 | S. Whitham  |
| PI P 574  | Plant Nematology                                 | Alt Summer, offered 2019 | F. Avendano |
| Micro 577 | Bacterial-Plant Interactions                     | Alt Spring, offered 2018 | G. Beattie  |
| Micro 692 | Molecular Biology of Plant-Pathogen Interactions | Alt Fall, offered 2018   | S. Whitham  |

## ANIMAL-MICROBE INTERACTIONS

|           |  |                          |            |
|-----------|--|--------------------------|------------|
| Micro 510 | Insect-Virus Interactions: A Molecular Perspective | Alt Fall, offered 2019   |            |
| V MPM 525 | Intestinal Microbiology                            | Alt Spring, offered 2018 | N. Cornick |
| Micro 625 | Mechanisms of Bacterial Pathogenesis               | Alt Spring, offered 2019 | C. Minion  |
| VMPPM 536 | Zoonoses and Environmental Health                  | Alt Spring, offered 2019 | C. Thoen   |
| Ent 574   | Medical Entomology                                 | Alt Spring, offered 2018 | R. Smith   |

## IMMUNOLOGY

|            |                          |                          |                 |
|------------|--------------------------|--------------------------|-----------------|
| Micro 575* | Immunology               | Spring                   | J. Cunnick      |
| Micro 540  | Livestock Immunogenetics | Alt Spring, offered 2019 | S. Lamont       |
| Micro 615  | Molecular Immunology     | Alt Fall, offered 2019   | A. Andreotti    |
| VMPPM 520* | Medical Immunology       | Fall                     | M. Wannemuehler |

\*Only one of Micro 575 or V MPM 520 can count for the POS.

**RECOMMENDED TECHNIQUE, LAB BASED, or STATISTICS COURSES:** Not to count towards the advanced micro course work area.

|                            |  |                        |                  |
|----------------------------|--|------------------------|------------------|
| BIOL 444                   | Bioinformatics Analysis                                      | Fall                   | H. Chou          |
| Micro 627                  | Rapid Methods in Food Microbiology                           | Alt Fall, offered 2018 | B. Brehm-Stecher |
| STAT 587<br>(formerly 401) | Statistical Methods for Research Workers                     | Fall, Spring, Summer   |                  |
| STAT 402                   | Statistical Design and the Analysis of Experiments           | Fall, Spring           |                  |
| STAT 581<br>(formerly 416) | Analysis of Gene Expression Data for the Biological Sciences | Spring                 | D. Nettleton     |
| PL P 594                   | Seed Pathology   | Alt Fall, Offered 2019 | Gary Munkvold    |
| VDPAM 522                  | Principles of Epidemiology and Population Growth             | Spring                 | A. O'Connor      |



## **ANNUAL REPORT OF STUDENT ACTIVITIES**

All students majoring in Microbiology are required to submit an Annual Report of Student Activities to the **IM Chair by August 15**. The format for this report is provided in the appendices. This Annual Report will be used as a tool to assess the strengths and weaknesses of the IM program, as well as to monitor the progress of all students in the IM program.

**NOTE:** The IM Program must have up-to-date Annual Reports before the IM Chair will provide a signature of approval on forms needed for advancement through the degree program.

*NOTE:* A cumulative GPA of at least 3.0 is required for tuition support by the Graduate College. If your overall GPA drops below 3.0, it is likely that you will have to pay this tuition yourself. The grading scale at ISU is: A (4.0), A- (3.67), B+ (3.33), B (3.0), B- (2.67), C+ (2.33), C (2.0), C- (1.67), D+ (1.33), D (1.0), and F (0). Research grades (699, 697) do not count towards GPA.

## PROGRESSING THROUGH YOUR DEGREE PROGRAM

### ***Program of Study Committee Appointment***

After you have obtained a major professor and home department, you will, in consultation with your major professor, decide on a suitable program for completion of your graduate course work. It is then necessary to appoint a graduate Program of Study (POS) Committee. The composition and responsibilities of the POS committee will be in accordance with the Graduate College guidelines.

The POS committee should include faculty whose research interests can aid and complement your research interests, as well as faculty whose expertise will ensure that you graduate with a breadth of knowledge. The POS committee for a **doctoral** student must consist of at least five members of the Graduate Faculty. These faculty are listed in the back of the Graduate Handbook. The committee must include at least three faculty, including the major professor, from within the Interdepartmental Microbiology major. At least one faculty member must be either outside the Microbiology major or outside your home department.

The POS committee for a **master's** student must consist of at least three members of the Graduate Faculty. It must include two members, including the major professor, from inside the Interdepartmental Microbiology major. One member of the committee must be either outside the major or outside your home department.

The Grad College recommends having your POS committee formed as early as the second semester of your degree program. This is especially important for MS students as they generally have about 2 to 2.5 years to complete their degree.

### ***Program of Study***

Once the chosen members of the POS committee have agreed to serve, the next step is to call your committee together, inform them of your research plans, and ask for their evaluation of your plans.

The Graduate College Program of Study is one of the more important documents you will encounter while in graduate school. In essence, it is a contract between you and the graduate school indicating the minimum course work which must be taken to complete a Ph.D. or M.S. degree. No changes can be made in it without the mutual approval of yourself, your committee, and the Graduate College.

After meeting with your POS Committee, now is the time to prepare and complete your Program of Study and Committee appointment (POSC) form. Use the [POSC worksheet](#) to help you practice prior to submitting the official online POSC form in AccessPlus. When filling out the POSC form, be sure to use the correct course

designators. It would be helpful if the Core IM courses are listed together on the form followed by the required seminars.

When the POSC form is completed and submitted, it will initiate an online approval process whereby the form will be routed automatically to the major professor, committee members, the Interdepartmental Microbiology Program DOGE and finally the Grad College for approval. Students are responsible to check on the status of their POSC to make sure it gets approved by the Grad College. This is especially important if students are planning to schedule a preliminary or final oral exam. The POSC must be received and approved by the Grad College a term before either of these exams is to be held.

Changes that occur in a student's program of study, such as due to changed objectives or unavailability of courses, should be approved by the student's committee and the IM Chair. Any recommended changes made after the student's POSC has been approved by the Grad College should be submitted on the online POSC form through AccessPlus and will require approval of the student, major professor, committee members involved and the IM DOGE before seeking final approval of the Grad College.

### ***POS Meetings***

The recommended time-frame for completing the POS tasks is to **1) form the POS Committee and 2) prepare and submit a written description of the proposed research to POS Committee, have a POS Committee meeting, and file the POSC Form within six months of joining a lab.**

Each year after the formation of your POS committee you should set up a time to meet with the members of your POS committee. IM recommends that Ph.D. students plan to do this in October of each school year following the Ph.D. Prelim (at least three committee members must be present), and recommends that M.S. students meet yearly until the final defense (at least two committee members must be present). Discussion should center on how your research is progressing and if there are areas that need to be addressed.

Scheduling a POS Committee meeting can sometimes be difficult; most professors have very full schedules. A recommended approach is to pick a two-week interval and then ask all POS committee members to list their free times during that interval. The student should estimate the time required for the meeting, in consultation with the major professor, and state this in their initial message to the POS committee members. The two-week interval should be at least several weeks in the future. After the faculty respond, the student can select one or a few times when everyone appears to be free, and when a room is available for the meeting, and again solicit the opinions of the POS committee members. This whole process needs to be

completed in one or two days so that slots that were free during the initial inquiry remain free. E-mail generally works best for this process.

### ***Preliminary Examination***

Ph.D. candidates majoring in Microbiology must pass a Preliminary Examination. The purpose of the Preliminary Examination is to test

- 1) breadth of knowledge in the area of Microbiology
- 2) depth of knowledge in a student's particular research area and
- 3) critical thinking skills especially as they pertain to the scientific method and hypothesis-based research.

For this purpose, the Preliminary Exam must contain both a written and an oral component. The nature of the written component is determined by the POS Committee and the home department, but often takes the form of a written grant proposal on research that is distinct from, but related to, the student's dissertation research. In this case, a major component of the oral examination is usually a defense of this proposal.

To initiate your Preliminary Exam, a Request-for-Preliminary-Examination form should be turned into the Graduate College at least two weeks prior to the date of your Preliminary Examination. "**Request for Preliminary Examination**" forms are available in IM Program Office and at the Graduate College. After processing your request, the Graduate College will send the IM Program Office the Preliminary Examination form, and this form should be given to your major professor. The results of the Preliminary Examination will be recorded on this form, it will be signed by all committee members, and it must be returned to the Graduate College. All committee members must be present at this examination. This examination should be completed by the end of the first semester of the third year of graduate training.

M.S. candidates are not required to take a Preliminary Examination.

### ***Writing Your Thesis***

All ISU theses will be digital ("ETDs" converted to a single file in PDF format) and submitted on-line. You are to check with the Grad College requirements and deadlines in the documents at <http://www.grad-college.iastate.edu/calendar/>.

All graduate theses and dissertations submitted to Iowa State University must comply with the requirements established by the Graduate College, as stated in the current [Thesis Manual](http://www.grad-college.iastate.edu/current/thesis/thesis_template/) [http://www.grad-college.iastate.edu/current/thesis/thesis\\_template/](http://www.grad-college.iastate.edu/current/thesis/thesis_template/) The Graduate College reviews the final thesis or dissertation and approves the final format before signing the final Approval Slip. Staffs are available to advise students on formatting problems they may encounter. In addition, staff conduct several informational seminars and workshops early each semester.

## ***Preparing for Graduation***

Each semester, the Graduate College publishes the deadline dates at <http://www.grad-college.iastate.edu/calendar/> for submission of appropriate forms and paperwork. Early in the semester in which you expect to graduate, you must submit to the Graduate College an **Application for Graduation** (found at <http://www.grad-college.iastate.edu/forms/forms.html>), which shows the expected date of graduation, exact thesis or dissertation title and other data. If you do not graduate at the expected time, a new diploma slip must be submitted at a later time.

After the dissertation or thesis has been completed, you should consult with your major professor and POS Committee to arrange a time for the Final Research Seminar and Final Examination. You must also request permission from the Graduate College to schedule the Final Examination using the "Request for Final Examination" form. This form is available online at the Graduate College website ([https://www.grad-college.iastate.edu/common/forms/student\\_forms.php](https://www.grad-college.iastate.edu/common/forms/student_forms.php)). When the Graduate College receives this request they will send a "**Report of Final Examination**" for reporting the examination result to the IM Program Coordinator, who will then provide the form to your major professor.

## ***Final Research Seminar***

All students are required to present a formal, public seminar describing their completed research. The seminar must be announced at least 2 weeks in advance to the Interdepartmental Microbiology faculty and students. You must notify the Chair and the IM Program Coordinator, and they will make the announcements.

## ***Final Examination (Defense)***

The Final Examination for the Ph.D. and M.S. degrees is an oral defense of the Ph.D. dissertation or M.S. thesis. All members of your POS committee must be present. This examination reviews the thesis and your knowledge of relevant subjects.

## ***Exit Interview***

When you receive the "Graduate Student Approval Slip for Graduation" form from the Graduate College, schedule at least a 15 minute exit interview with the IM Chair. You will need the Chair's signature as DOGE for Microbiology on the Graduate Student Approval Slip.

## ***Staying in Touch***

Interdepartmental Microbiology always enjoys hearing from you. Please stay in touch with us at [microbiology@iastate.edu](mailto:microbiology@iastate.edu).

## **ADDITIONAL ACADEMIC ACTIVITIES**

The activities listed below are not required, but are encouraged.

### ***Microbiology Graduate Student Organization (M.G.S.O.)***

The M.G.S.O. is an academically oriented organization whose main purpose is to unite fellow graduate students pursuing similar career goals in areas of Microbiology. It is an active forum for the discussion of microbiology related topics and actively sponsors guest speakers.

### ***The Graduate Student Senate***

Information on the Graduate Student Senate, G44 Memorial Union, can be found at <https://www-gpss.sws.iastate.edu/>. The Interdepartmental Microbiology Program has a student elected representative on this council, and the election for this representative is administered by the Microbiology Graduate Student Organization.

### ***Student Meetings with the Chair***

The IM program will have yearly or bi-yearly spring meetings (usually in May) in which students in their second year or beyond are encouraged to meet with the Chair and Supervisory Committee. The purpose of these meetings is to provide feedback on how the program is doing and what can be done to improve it.

### ***Prospective Student Recruitment***

The IM program occasionally requests students to meet for lunch or evening meals in an informal atmosphere with prospective graduate students. This is an opportunity for the prospective student to get the "real scoop" on graduate training at ISU. IM pays for the meals. Notices of meeting opportunities are made through e-mail to all of students.

### ***Meetings with Visiting Scientists***

The IM program occasionally offers opportunities for students to meet with visiting scientists for lunch or evening meals. IM pays for the meals. Notices of such opportunities are made through e-mail to all students, and participation in such meetings is strongly encouraged.

### ***Training in Grant Writing***

Students are encouraged to participate in activities that provide experience in grant writing. The following courses offer such experience: Writing Proposals and Grant Applications (Engl 509), a special section is sometimes offered for non-English major graduate students; Grant Proposal Writing (FSHN 695); Entomology 590E Special Research Topics: Communications in Biological Sciences (Ent 590E).

### ***Preparing Future Faculty Program***

Preparing Future Faculty (PFF) is a national program for postdoctoral fellows and M.S. and Ph.D. students that is designed to provide supplemental preparation for a faculty career through a combination of seminars, mentoring, and practical classroom and service experiences (<http://www.celt.iastate.edu/graduate-students-postdocs/preparing-future-faculty>). The PFF program at ISU is designed to be flexible, so students can participate in the program for as few as one or as many as four semesters, and semester components can be altered to fit individual circumstances.

### ***Preparing Material for Research Presentations***

The Instructional Technology Center office on campus provides services relating to visual and audio media, including loaning equipment to departments, students, faculty, and staff. Although most of the equipment used in 1200 Communications Building is free to students, you will need to pay for some things.

### ***Computer Short Courses***

Academic Information Technologies (AIT) offers Short Courses on a wide range of topics related to the use of technologies, including beginning and advanced courses on the use of Project Vincent, Virtual Tour of Gopherspace, World Wide Web, and Microsoft Word for Windows and Macintosh. The Solution Center, 192 Parks Library (294-4000, email: [solution@iastate.edu](mailto:solution@iastate.edu)) can assist with questions regarding short course registration, computers, software or the network. Because of the student computing fees paid by all students, you can take the short courses for free. The *Computation Center Newsletter* is free if requested and can be sent to your campus mailing address.

## **ACCESSPLUS**

AccessPlus is your secure and personalized online resource for accessing your important and confidential university information and web applications. AccessPlus is available to Iowa State University students and faculty/staff, day or night, seven days a week, from anywhere in the world.

To login to AccessPlus, all you need is your Social Security Number or University ID, and your university PIN. Once inside AccessPlus, your tabs and menus are customized to meet your specific needs. For example, only registered students can view their current course schedule, and only faculty/staff can view their most recent pay information.

AccessPlus offers a wide range of services from changing your address and managing your CyCash account to viewing, or even paying your university bill online. Some of the other many services available for **students** through AccessPlus include:

- class registration
- class schedules
- financial aid
- grade reports and transcripts
- job board
- residence halls and dining
- graduate student status
- university bill
- payroll and benefits

## **Surviving it All**

One of the first genuine shocks for many students in graduate school is how hard they need to work to keep up with classes, research, and other responsibilities. Most students find that they need to work harder as graduate students than at any time before in their lives, and the number of hours per week can be staggering. If you are like most students and discover that there simply are not enough hours in the day, then the best way to survive is to learn how to select your priorities and focus on them. Your professor, other faculty, and your fellow students can give you advice. If you feel so overwhelmed that you cannot function efficiently, counseling services are also available on campus specifically to help students who are having trouble meeting their personal and professional obligations. Student Counseling Services are available on the third floor of the Student Services Building. Their phone number is 294-5056.



**CHECKLIST FOR COMPLETION OF GRADUATE REQUIREMENTS  
FOR INTERDEPARTMENTAL MICROBIOLOGY GRADUATE PROGRAM**

Student: \_\_\_\_\_  
Degree Sought: \_\_\_\_\_  
Date Started in IM: \_\_\_\_\_  
Major Professor: \_\_\_\_\_  
Co-advisor (if any): \_\_\_\_\_  
Major: \_\_\_\_\_ MICROBIOLOGY \_\_\_\_\_  
Minor or Co-Major: \_\_\_\_\_

For each requirement in the following sections, list the term and year you met the requirement; for example, F14, S15, or SS15. If you have not completed a requirement yet, leave the line blank. Times when you should complete each requirement are indicated in parentheses.

**Academic Requirements**

Joined Laboratory of Major Professor: \_\_\_\_\_

**Request to Establish a Home Department:** \_\_\_\_\_

POS Committee Formed: \_\_\_\_\_  
(within 6 months of joining your major professor's laboratory)

Research Plan and Program of Study Approved by the POS Committee: \_\_\_\_\_  
(within 6 months of joining your major professor's laboratory)

**POSC Submitted and Approved by the Grad College:** \_\_\_\_\_

Preliminary Exam (Ph.D. only): \_\_\_\_\_  
(by the end of first semester of third year) (Note: The preliminary exam must include a written component)

Thesis Submitted to POS Committee: \_\_\_\_\_  
(The thesis must be given to your POS committee at least two weeks prior to your defense.)

Final Research Seminar: \_\_\_\_\_  
(Note: This must be a public seminar and the announcement must be given to the IM Program Coordinator to distribute to all IM faculty and students. If possible, the seminar should be given during a regularly scheduled seminar series.)

Defense: \_\_\_\_\_

## CHECKLIST FOR COMPLETION OF COURSE AND TRAINING REQUIREMENTS

*If requirement has been waived, indicate date of approval of waiver.\**

|  | <i>Semester Completed</i> |       |
|--|---------------------------|-------|
| <u>Core Courses</u>  |                           |       |
| Micro 551<br>(Microbial diversity and phylogeny)                             | _____                     | _____ |
| Micro 552<br>(Bacterial molecular genetics and physiology)                   | _____                     | _____ |
| Micro 553<br>(Pathogenic microorganisms)                                     | _____                     | _____ |
| Micro 554<br>(Virology)  | _____                     | _____ |
| Micro 555<br>(Fungal Biology)  | _____                     | _____ |
| Micro 556<br>(Microbial ecology and environmental monitoring)                | _____                     | _____ |
| BBMB 404<br>(Biochemistry)   | _____                     | _____ |
| BBMB 405<br>(Biochemistry)   | _____                     | _____ |
| GR ST 565<br>(Professional Practice in the Life Sciences)                    | _____                     | _____ |
| <u>Other required courses</u>  |                           |       |
| Additional Microbiology courses<br>9 credits (Ph.D.) or 3 credits (M.S.)     | _____                     | _____ |
| Micro 604<br>(Microbiology Seminar)<br>5 credits (Ph.D.) or 3 credits (M.S.) | _____                     | _____ |
| <u>Other requirements</u>  |                           |       |
| Formal presentations<br>2 for Ph.D. or 1 for M.S.                            | _____                     | _____ |

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\*The transferability of credits from other institutions will be determined on a case-by-case basis by the student's POS Committee and the IM Chair. To waive a course requirement, send a memo, signed by your major professor (on behalf of your POS Committee) and the instructor of the course you wish to waive, to the IM Chair. The memo should state that you have already received satisfactory instruction in the subject matter covered by the required course. Credits for seminars, workshops and colloquia are not transferable.

## **FINANCIAL MATTERS**

### ***Your Appointment***

Most students in Interdepartmental Microbiology receive some form of financial support. However, the amount, source of the support, and responsibilities associated with it, vary from situation to situation. Students entering directly may be awarded a research assistantship (RA) funded by Interdepartmental Microbiology during their first year; thus, for these students, the amount of the stipend for the first year is usually determined by the IM program. Stipends for students supported by the faculty are determined by the faculty, but must be above the minimum stipend set by the IM program. As typically arranged by the faculty, some students may be awarded a teaching assistantship (TA). The responsibilities associated with your stipends depend on whether you have an RA or a TA. Information about TA and RA support is available in the Graduate College Handbook.

All graduate students on assistantships have signed a Graduate Assistantship Letter of Intent that lists the terms and conditions of their appointment. Generally, graduate assistantship appointments are on a "one-half time" basis. "Half-time" is the maximum time appointment for graduate students since the other half of your time is spent as a student in graduate studies and research. Appointments may be terminated by mutual consent or for cause as described in the Graduate College Handbook. If you have any questions regarding your appointment, see the IM Program Coordinator.

Payday at the University is the last working day of each month. Your paycheck will be sent through campus mail to you by the ISU Treasurer to the university address you have given to the Human Resources Office (Room 3810, Beardshear), or you may authorize the Treasurer to deposit your check in a bank of your choice by completing an authorization form available at the Human Resources Office. It is strongly recommended that you have your check sent to a banking institution. If applicable, deductions are made for Federal and State income taxes.

### ***Grants for Research***

The Graduate Student Senate (GSS) provides funds to support graduate student research. GSS will provide up to a maximum of \$300 to each person submitting a research proposal. The projects for which you submit the proposals must be *unrelated* to your thesis or dissertation research. It is appropriate for you to apply for these funds during your first year while you are rotating through research labs. You can obtain the "Request for Professional Advancement Grant" form on the web at <http://www.gpss.iastate.edu/students/pag/>.

## **Grants for Professional Travel**

Attendance and presentation of research results at professional meetings is an essential part of your training. All students should, if possible, attend at least one national or international meeting during their degree program.

To assist you in doing this, support for travel to professional meetings and conferences is available from the Graduate College, the Graduate Student Senate, the IM Program and some home departments.

- To request travel funds from the Graduate College and the [Graduate and Professional Student Senate \(GPSS\)](#), complete the online Professional Advancement Grants form (available at <http://www.gpss.iastate.edu/professional-advancement-grants>).
- To request travel funds from the IM Program, submit a copy of this form as well as an abstract, if you are submitting one, to the IM Chair, or if requesting funds only from the IM Program, submit your request directly to the IM Chair.
- For first-year graduate students on rotation, your college is the Graduate College and the signature of the IM Chair will be sufficient.
- You may only receive one Professional Advancement Grant from the Graduate College and Graduate Student Senate for travel each fiscal year.
- The IM Program will provide support as funds are available. Eligible students may receive up to \$250 per travel per year.
- Eligibility: students must be in good standing in their degree program, present research data at a conference they will attend, and have their annual report submitted and up to date.

Some funding agencies have a 90-day limit for turning in travel expense vouchers. If your trip is being supported in part by funds from your major professor, be sure to turn in your travel expense voucher soon after you return to insure that you will be reimbursed.

## **BENEFITS**

### **ISU Student Health Insurance Program**

Group Hospital, Surgical, and Medical Insurance:

<http://www.hrs.iastate.edu/sship/homepage.html>

Single student coverage under the ISU Student and Scholar Health Insurance Program is provided *free of charge* to all graduate assistants at ISU. For new to ISU students, an ISU Insurance Program booklet should be mailed to you through campus mail as soon as you are entered on the payroll system. Students enroll for Health Insurance going on the line to Accessplus

<https://accessplus.iastate.edu/frontdoor/login.jsp>, clicking on the Student Tab and clicking through on Health Insurance and following the instructions provided for registration.

Newly employed personnel should not drop any other insurance they may have until they know the beginning date of the ISU insurance. The Student and Scholar Health Insurance Program is available for the spouse/domestic partner of students and the children of students. For details and enrollment cutoff dates on the ISU Student and Scholar Health Insurance Program, please contact the student insurance representative (515-294-4820).

All international students, whether on assistantship or not, are required to carry the ISU Student Health Insurance or to be covered by another health insurance policy. For more information, contact the [International Students and Scholars Office](#) (ISSOS) in 3248 Memorial Union (294-1120).

### **Prescription Drug Benefit Program**

Graduate students on assistantship receive single coverage free of charge in a prescription drug benefit program that reduces the cost of generic and prescription drugs available at the Student Health Center Pharmacy. Information on this benefit can be found at: <http://www.health.iastate.edu/pharmacy/>.

### **Health Service**

As a student, you are eligible to use the ISU Student Health Service. [Thielen Student Health Center](#) is a complete outpatient medical clinic located west of Beyer Hall. The health fee covers consultations with medical staff and subsidizes charges for services, such as laboratory tests, immunizations, x-rays, and pharmaceuticals. A range of services is offered, including medical exams (physicals), women's health care, sports medicine, physical therapy, STD testing and treatment, travel immunizations, and a full-service pharmacy. Specialty services offered at a reduced rate include psychiatry, orthopedics, and ear, nose and throat. A *mandatory* Student Health fee and Health Facility fee per semester will be assessed to all students registered. The Thielen Student Health Center is located at Sheldon and Union Drive on the northwest side of campus. <http://www.health.iastate.edu>

Additional information on the student group plan medical insurance and the benefits of the mandatory health fee may be obtained at: <http://www.hrs.iastate.edu/hrs/sship>.

Dental Insurance is available for a fee: <http://www.deltadentalia.com/>.

### **Vacations and Sick Leave**

**Research Assistants (RA)** with half-time appointments (C base) earn vacation at a rate of eight hours per month. Because you are half-time, this is equivalent to two calendar days. To take vacation, you must obtain the approval of your major professor and notify the office staff in your home department. If you are a first year student on a rotation, you must obtain approval from your Temporary Graduate

Advisor and notify the IM Program Coordinator. Accumulated vacation time is forfeited upon completion of your appointment. (See your Graduate College Handbook for detailed information.)

To obtain approval for vacation time you need to fill out an Absence Request card. In your first year, the card needs to be signed by your Temporary Graduate Advisor and submitted to the IM Program Coordinator. In later years, the Absence Requests will be handled by your home department. Students on assistantships are employees of ISU and therefore are allowed off on university holidays with subsequent absences to be taken as vacation.

**Teaching Assistants (TA)** are subject to the academic calendar and do not accumulate vacation time. However, they are not required by the University to work when classes are not in session. Teaching Assistants are strongly advised to notify the instructor under whose supervision they are teaching of any vacations or travel plans that could influence their ability to carry out their teaching responsibilities. Graduate assistants on teaching assistantships must also get approval from their major professor before taking a vacation from their research responsibilities.

Graduate assistants of any type on half-time appointments accumulate six hours of sick leave per month. Since you are on a half-time appointment, this is equivalent to one-and-a-half calendar days. If you will be absent because of an illness, you should call your major professor as soon as possible on the day you are sick and must be absent. On your return, you will need to fill out an Absence Request form for sick leave. You should also use the form in advance when you have a planned absence for medical reasons. Maternity/Paternity leave can be taken as sick leave and/or vacation. Accumulated sick leave is forfeited upon completion of your appointment.

### ***Injuries and Injury Reports***

If you are injured while performing your duties as a Graduate Assistant, you must stop by the office of your home department or the IM Program Office and fill out an Employers First Report of Injury (<http://www.ehs.iastate.edu/occupational/accidents-injuries>.) as soon as you are able to do so. As a rule, the University's Worker's Compensation insurance carrier will pay for your medical care.

### ***Student Counseling***

Student Counseling Service (SCS) provides a wide range of services to help students gain the most from their college experience. SCS offers career counseling, personal counseling, group counseling, and workshops. Most services provided by SCS are short-term in nature, and SCS can assist students needing long-term assistance with referrals to community services (<http://www.public.iastate.edu/~stdtcouns/>).

Some of the typical issues SCS assists students with include career decision-making, coping with relationship problems, low self-esteem, stress, loneliness, depression,

cultural differences, sexual assault recovery, trauma, childhood abuse, conflicts over sexuality, substance abuse, eating disorders, academic motivation, and other concerns. Other services include the Substance Abuse Prevention Program, Career Resource Center, Learning Disabilities Screening, Placement Testing, and consultation and outreach services. SCS also provides consultation and training to faculty and staff to assist them in addressing the psychological needs of students.

### ***Crisis Services through Student Counseling Services***

If you have an urgent matter and feel it would be important to speak to a counselor as soon as possible, please call the SCS desk at 294-5056 and let the receptionist know that you are requesting a same-day crisis appointment or simply come to our office in the Student Services Building on the 3rd floor. SCS counselors save some appointments each day for such matters. If this is after hours or on a weekend/holiday when SCS is not open, and you feel it is important to speak to someone, you may call the Richmond Center at 515-232-5811. **IF THIS IS A LIFE THREATENING SITUATION OR ONE THAT COULD RESULT IN HARM TO YOURSELF OR SOMEONE ELSE, CALL 911.**

Recreation Services Office: [www.recservices.iastate.edu](http://www.recservices.iastate.edu)

Legal Assistance: [www.dso.iastate.edu/sls](http://www.dso.iastate.edu/sls)

Student Organizations: <https://www.stuorg.iastate.edu/>

### ***Dean of Students Office (DSO) and Student Assistance Services (SAS)***

Members of the [Dean of Students Office \(DSO\)](#) and Student Assistance Services (SAS) assist students as they manage issues surrounding academic concerns, personal matters/ emergencies, and navigation of university policies and procedures. DSO/SAS staff members counsel students on effective ways of filing academic grievances, refer students to university & community resources, provide notification of faculty in emergency absence situations, intervene and follow up with students experiencing mental and physical crises, and provide assistance in understanding the University judicial system. In general, the DSO and SAS are places where students can find answers or start on the path to their own solutions.

These pages are designed to alleviate some frequent concerns, but it can be very helpful to talk one-on-one with a DSO staff member. Students, family members, and ISU faculty/staff seeking assistance can contact [dso-sas@iastate.edu](mailto:dso-sas@iastate.edu). Coordinator of Outreach Services; stop in to the Dean of Students Office (1010 Student Services Building); or call 515/294-1020 (TTY 515/294-6635) to schedule an appointment.

An Excellent Source of Information for all things graduate student—the Iowa State University Graduate College Handbook: <http://www.grad-college.iastate.edu/handbook/>.

## **ADMINISTRATIVE MATTERS**

### ***Administrative Assistance***

There are a number of offices on campus to help with the administration of your graduate program. The main one for Microbiology students is the Interdepartmental Microbiology Office. Dai Nguyen is the IM Program Coordinator and can provide help with questions about all administrative procedures. (Academic advice about courses and rotations will be provided by your Temporary Graduate Advisor or major professor).

Dai Nguyen  
Interdepartmental Microbiology Program  
207 Science I  
☎ 515-294-9052  
FAX 515-294-6019  
E-mail: microbiology@iastate.edu

### ***Office and Home Address***

The Interdepartmental Microbiology program needs to know your local address and telephone number and also needs to be informed of any changes in your address or phone number that may occur during your tenure in the program.

All first year IM RAs will have a mailbox in the IM Program Office. Your permanent office (desk) address will be determined once you have chosen a major professor. If you do laboratory rotations, you should be given a temporary desk in each laboratory as you proceed through your rotations. You may also be assigned temporary office space for your first academic year.

### ***Communication***

It is vital that you maintain good contact with Interdepartmental Microbiology personnel throughout your graduate program. This is most easily done using e-mail.

E-mail. E-mail should be checked at least daily as this is the *primary means* of keeping students and faculty informed about program activities. You may use the following e-mail addresses to reach all students and faculty in the program:

**micrograd@iastate.edu** (reaches all IM graduate students)  
**microfac@iastate.edu** (reaches all IM faculty members)

Internet. Most of the information that pertains to the program in general can be found at the following web site: <http://www.micrograd.iastate.edu/>



Mail Service: You will normally pick up your mail in your home department. If you have not yet chosen a home department, a temporary mailbox will be assigned to you in 207 Science I. You should check for mail on a regular basis (at least twice a week). If the office door is unlocked but closed, *please feel free* to come into the office to obtain your mail.

Telephone: Local calls (phone numbers in Ames) may be made on most campus phones. Long distance personal calls must **not** be made on University phones.

## **Transportation**

Bicycles: You can park your bicycle at many locations on campus. Except for walks labeled as bike paths, bicycle riders must not use campus sidewalks. A bicycle used between sundown and sunrise must be equipped with a headlight, tail lights or an adequate reflector, and a warning device. Bicycles used only on campus can be registered free through the ISU Parking office. Bicycles used off campus must be registered by the city of Ames. The licenses may be obtained from various locations in Ames (Hy-Vee, Michael's Cyclery, all bike shops in Ames, Ames City Offices - Finance, the University Book Store), from the Parking Systems Office in the Armory on campus or online <http://www.cityofames.org/government/departments-divisions-i-z/police/permits/bicycle-permit>.

Buses: The city of Ames has an excellent bus system called CyRide. During the school year the buses leave from most locations every 20 minutes. If you show a current, paid University fee card, you can ride for free. <http://www.cyride.com/>

Cars and Parking: A copy of the ISU Traffic and Parking Regulations can be obtained from Public Safety, Parking Division, 27 Armory. Consult the section covering students: <http://www.parking.iastate.edu/>.

## **APPENDICES**

*ANNUAL REPORT OF STUDENT ACTIVITIES*  
**Interdepartmental Microbiology Graduate Program, Iowa State University**  
**August 1 to July 31**

All students majoring in Microbiology are required to submit an Annual Report to the IM Chair by August 15 of each year. This Annual Report will be used as a tool to assess the strengths and weaknesses of the IM program, as well as to monitor your progress. The information that is to be included, as well as a suggested format for reporting your activities for the last year, is described below. Use only the headings for which you have something significant to report, and report items in only one location (in the category which you feel is most appropriate). Please include activities that have occurred during the period from August 1 of the previous calendar year to July 31 of the year of the submission of the report. In addition to the Annual Report of Student Activities, please provide a current Curriculum Vita that reflects your cumulative career activities. Provide the completed Annual Report to the IM Program Coordinator by August 15.

***I. Introduction***

Name

Dates covered by this Annual Report: (e.g., August 1, 2017 – July 31, 2018)

Semester that you first registered for courses

Date Home Department Established

Date of POSC Submitted

Date of Approval of POSC by the Grad College

Date of Preliminary Exam

Date that POS Committee last met

Awards and Honors

***II. Academic Performance***

Courses taken during the reporting year (list course name, number, instructor, credits, semester taken, and grade)

***III. Research Activities***

Research Project (describe progress made in research during the reporting year)

***IV. Publications***

For publications during the last year, provide authors, date, title, name of journal or publication, volume, and pages, and for each publication, estimate the percentage of the total contributions to the publication that were *your* contributions in each of the following areas: Concept development and design (X%); data acquisition (X%); data analysis (X%); writing (X%)

A. Refereed journal articles (Published, in press and in the review process. Do not include articles in preparation)

B. Non-refereed journal articles, newsletters, and conference proceedings in technical, semi-technical and popular publications.

C. Books and chapters in books.

D. Published abstracts.

E. Published book reviews and letters or comments to the editor.

F. General audience publications such as bulletins, pamphlets, brochures, state-of-the-art updates, fact sheets, home study materials, etc.

***V. Presentations***

Presentations (include oral and written presentations at scientific conferences, on campus, such as in seminar series, and at other professional meetings; provide the name of the presentation, date, name of the conference/meeting/seminar series, the type of presentation, such as a talk or poster, and estimate the attendance at your presentation)

## ***VI. Grants***

Grants (For proposals that you have submitted or that list you as a participant, provide the following: title of proposal, name of granting agency, amount of funds requested, effective dates of grant, principal investigators, and your role in the grant. Provide this information for both proposals submitted and grants funded; indicate funded grants.)

## ***VII. Teaching Activities***

Courses taught and Evaluation (list course number, course title, semester taught, credit hours, and number enrolled; describe your teaching responsibilities; if possible, include evidence of evaluate teaching effectiveness, including student evaluation summaries)

Course development (describe innovative teaching techniques and materials developed)

Mentor activities (describe activities in which you mentored other scientists in microbiology, including children, high school students, undergraduate students, other graduate students, post-doctoral researchers, visiting scientists, and faculty)

Other teaching accomplishments, including peer review of teaching activities and other significant activities of the past year not already discussed

## ***VIII. Professional Improvement Activities***

Membership in Professional and Honor Societies (including MGSO)

Meetings, Conferences and Workshops attended

## ***IX. Institutional and Professional Service***

Committee Activities (Indicate membership on institutional and professional committees, offices held and length of service; describe activities)

Other significant institutional and professional activities not already discussed

## ***X. Other information useful in assessing your activities***

## ***XI. Program Feedback***

If you have any comments, suggestions, or feedback on your courses, the IM program, or other factors that are influencing your training program, you are welcome to include them.

Please attach a current Curriculum Vita to this completed Annual Report of Student Activities and send it via e-mail to your Major Advisor, with the request that your Major Advisor review it and when approved, forward it to the IM Program Coordinator. (dna112@iastate.edu)

**NOTE:** The IM Program must have up-to-date Annual Reports before the IM Chair will provide a signature of approval on forms needed for advancement through the degree program.

## Interdepartmental Microbiology Graduate Program Faculty

To Contact all IM Faculty: [microfac@iastate.edu](mailto:microfac@iastate.edu)  
 To Contact all IM Graduate Students: [micrograd@iastate.edu](mailto:micrograd@iastate.edu)  
 Administration 4-9052 [microbiology@iastate.edu](mailto:microbiology@iastate.edu) Interdepartmental Microbiology

| Name                   | Office/Lab    | E-mail   | Department                           |
|------------------------|---------------|--|--------------------------------------|
| Allen, Heather         | 4-5776        | <a href="mailto:hkallen@iastate.edu">hkallen@iastate.edu</a>           | Vet Micro and Prev Medicine          |
| Allison, Milton        | 4-3439        | <a href="mailto:mallison@iastate.edu">mallison@iastate.edu</a>         | Animal Science                       |
| Beattie, Gwyn          | 4-5571/4-3198 | <a href="mailto:gbeattie@iastate.edu">gbeattie@iastate.edu</a>         | Plant Pathology and Microbiology     |
| Beck, Joshua           | 4-8293        | <a href="mailto:jrbeck@iastate.edu">jrbeck@iastate.edu</a>             | Biomedical Sciences                  |
| Bellaire, Bryan        | 4-1006        | <a href="mailto:bbella@iastate.edu">bbella@iastate.edu</a>             | Vet Micro and Prev Medicine          |
| Bhattacharyya, Madan   | 4-2505        | <a href="mailto:mbhattac@iastate.edu">mbhattac@iastate.edu</a>         | Agronomy                             |
| Blanchong, Julie A     | 4-9699        | <a href="mailto:julieb@iastate.edu">julieb@iastate.edu</a>             | NREM                                 |
| Blitvich, Bradley      | 4-9861        | <a href="mailto:blitvich@iastate.edu">blitvich@iastate.edu</a>         | Vet Micro and Prev Medicine          |
| Bobik, Thomas A        | 4-8247        | <a href="mailto:bobik@iastate.edu">bobik@iastate.edu</a>               | Biochem, Biophys & Mol Biol          |
| Boury, Nancy           | 4-6019        | <a href="mailto:nan1@iastate.edu">nan1@iastate.edu</a>                 | Plant Pathology and Microbiology     |
| Brehm-Stecher, Byron F | 4-4210        | <a href="mailto:byron@iastate.edu">byron@iastate.edu</a>               | Food Science & Human Nutrition-H Sci |
| Burrough, Eric R       | 4-0190        | <a href="mailto:burrough@iastate.edu">burrough@iastate.edu</a>         | Vet Diag and Prod Anim Med           |
| Carlson, Steve         | 4-0912        | <a href="mailto:stevec@iastate.edu">stevec@iastate.edu</a>             | Biomedical Sciences                  |
| Cho, Michael           | 4-6449        | <a href="mailto:mcho@iastate.edu">mcho@iastate.edu</a>                 | Biomedical Sciences                  |
| Cornick, Nancy         | 4-6499/4-4096 | <a href="mailto:ncornick@iastate.edu">ncornick@iastate.edu</a>         | Vet Micro and Prev Medicine          |
| Cunnick, Joan E        | 4-2070/4-7863 | <a href="mailto:jcunnick@iastate.edu">jcunnick@iastate.edu</a>         | Animal Science                       |
| Dickson, James S       | 4-4733/4-3165 | <a href="mailto:jdickson@iastate.edu">jdickson@iastate.edu</a>         | Animal Science                       |
| Ellis, Timothy G       | 4-8922        | <a href="mailto:tge@iastate.edu">tge@iastate.edu</a>                   | Civil, Constr. & Environ Eng.        |
| Friedberg, Iddo        | 4-5959        | <a href="mailto:idoerg@iastate.edu">idoerg@iastate.edu</a>             | VMPM                                 |
| Gauger, Phillip C      | 4-2437        | <a href="mailto:pcgauger@iastate.edu">pcgauger@iastate.edu</a>         | Vet Diag and Prod Anim Med           |
| Gleason, Mark L        | 4-0579/4-0589 | <a href="mailto:mgleason@iastate.edu">mgleason@iastate.edu</a>         | Plant Pathology and Microbiology     |
| Gupta Mohan            | 4-3951        | <a href="mailto:mgupta@iastate.edu">mgupta@iastate.edu</a>             | GDCB-LAS                             |
| Halverson, Larry J     | 4-0495/4-9729 | <a href="mailto:larryh@iastate.edu">larryh@iastate.edu</a>             | Plant Pathology and Microbiology     |
| Harrington, Thomas C   | 4-0582/4-3921 | <a href="mailto:tharrin@iastate.edu">tharrin@iastate.edu</a>           | Plant Pathology and Microbiology     |
| Hostetter, Jesse M     | 4-0953        | <a href="mailto:jesseh@iastate.edu">jesseh@iastate.edu</a>             | Vet Pathology                        |
| Howe, Adina            | 4-0176        | <a href="mailto:adina@iastate.edu">adina@iastate.edu</a>               | ABE                                  |
| Ikuma, Kaoru           | 4-7660        | <a href="mailto:kikuma@iastate.edu">kikuma@iastate.edu</a>             | Civil, Constr. & Environ Eng.        |
| Jarboe, Laura          | 4-2319        | <a href="mailto:ljarboe@iastate.edu">ljarboe@iastate.edu</a>           | Chemical & Biological Eng            |
| Kohut, Marian L        | 4-8364        | <a href="mailto:mkohut@iastate.edu">mkohut@iastate.edu</a>             | Kinesiology                          |
| Kreuder, Amanda Jo     | 4-2174        | <a href="mailto:akreuder@iastate.edu">akreuder@iastate.edu</a>         | Vet Diag and Prod Anim Med           |
| Li, Ganwu              | 4-3358        | <a href="mailto:liganwu@iastate.edu">liganwu@iastate.edu</a>           | Vet Diag and Prod Anim Med           |
| Logue, Catherine Mary  | 4-3785        | <a href="mailto:cmlogue@iastate.edu">cmlogue@iastate.edu</a>           | Vet Micro and Prev Medicine          |
| Looft, Torey P         | 4-5776        | <a href="mailto:tlooft@iastate.edu">tlooft@iastate.edu</a>             | Vet Micro and Prev Medicine          |
| Lyte, Mark             | 4-5957        | <a href="mailto:mlyte@iastate.edu">mlyte@iastate.edu</a>               | Vet Micro and Prev Medicine          |
| Mansell, Thomas Joseph | 4-7642        | <a href="mailto:mansell@iastate.edu">mansell@iastate.edu</a>           | Chemical & Biological Eng            |
| Mellata, Melha         | 4-9220        | <a href="mailto:mmellata@iastate.edu">mmellata@iastate.edu</a>         | FSHN - AGLS                          |
| Mendonca, Aubrey F     | 4-2950        | <a href="mailto:amendon@iastate.edu">amendon@iastate.edu</a>           | FSHN - AGLS                          |
| Miller, Cathy          | 4-4797        | <a href="mailto:clm@iastate.edu">clm@iastate.edu</a>                   | Vet Micro and Prev Medicine          |
| Miller, W. Allen       | 4-2436/4-4754 | <a href="mailto:wamiller@iastate.edu">wamiller@iastate.edu</a>         | Plant Pathology and Microbiology     |
| Minion, F Chris        | 4-6347        | <a href="mailto:fcminion@iastate.edu">fcminion@iastate.edu</a>         | Vet Micro and Prev Medicine          |
| Moorman, Thomas B      | 4-2308        | <a href="mailto:tom.moorman@ars.usda.gov">tom.moorman@ars.usda.gov</a> | National Lab for Ag & the Environ    |
| Munkvold, Gary P       | 4-7560        | <a href="mailto:munkvold@iastate.edu">munkvold@iastate.edu</a>         | Plant Pathology and Microbiology     |
| Olsen, Steven          | 4-3282        | <a href="mailto:solsen@iastate.edu">solsen@iastate.edu</a>             | Veterinary Pathology                 |
| Ong, Say K             | 4-3927        | <a href="mailto:skong@iastate.edu">skong@iastate.edu</a>               | Civil, Construc & Environ Eng        |
| Parkin, Timothy B      | 4-6888        | <a href="mailto:tim.parkin@ars.usda.gov">tim.parkin@ars.usda.gov</a>   | National Lab for Ag & the Environ    |

|                       |               |  |                                  |
|-----------------------|---------------|--|----------------------------------|
| Phillips, Gregory J   | 4-1525/4-8824 | <a href="mailto:gregory@iastate.edu">gregory@iastate.edu</a>   | Vet Micro and Prev Medicine      |
| Plummer, Paul J       | 4-8522        | <a href="mailto:pplummer@iastate.edu">pplummer@iastate.edu</a> | Vet Diag and Prod Anim Med       |
| Rasmussen, Mark Axel  | 4-3711        | <a href="mailto:markras@iastate.edu">markras@iastate.edu</a>   | Leopold Center                   |
| Reuel, Nigel          | 4-4592        | <a href="mailto:reuel@iastate.edu">reuel@iastate.edu</a>       | Chemical & Biological Eng        |
| Roth, James Allen     | 4-8459        | <a href="mailto:jarothe@iastate.edu">jarothe@iastate.edu</a>   | Vet Micro and Prev Medicine      |
| Sahin, Orhan          | 4-3861        | <a href="mailto:osahin@iastate.edu">osahin@iastate.edu</a>     | Vet Diag and Prod Anim Med       |
| Schmitz-Esser Stephan | 4-2739        | <a href="mailto:sse@iastate.edu">sse@iastate.edu</a>           | Animal Science                   |
| Scupham, Alexandra    | 4-5776        | <a href="mailto:ascupham@iastate.edu">ascupham@iastate.edu</a> | Vet Micro and Prev Medicine      |
| Sebranek, Joseph G    | 4-1091        | <a href="mailto:sebranek@iastate.edu">sebranek@iastate.edu</a> | Animal Science                   |
| Shao, Zengyi          | 4-1132        | <a href="mailto:zyshao@iastate.edu">zyshao@iastate.edu</a>     | Chemical & Biological Eng        |
| Smith, Ryan Chad      | 4-8828        | <a href="mailto:smithr@iastate.edu">smithr@iastate.edu</a>     | Entomology                       |
| Soupir, Michelle      | 4-2307        | <a href="mailto:msoupir@iastate.edu">msoupir@iastate.edu</a>   | ABE                              |
| Sponseller, Brett A   | 1-5243        | <a href="mailto:baspon@iastate.edu">baspon@iastate.edu</a>     | Veterinary Clinical Sciences     |
| Swanner, Elizabeth S  | 4-5826        | <a href="mailto:eswanner@iastate.edu">eswanner@iastate.edu</a> | GE AT Sci                        |
| Vaughn, Eric Martin   | 296-7016      | <a href="mailto:emvaughn@iastate.edu">emvaughn@iastate.edu</a> | Vet Micro and Prev Medicine      |
| Verhoeven, David      | 4-2562        | <a href="mailto:davidver@iastate.edu">davidver@iastate.edu</a> | Vet Micro and Prev Medicine      |
| Wannemuehler, Michael | 4-3534        | <a href="mailto:mjwannem@iastate.edu">mjwannem@iastate.edu</a> | Vet Micro and Prev Medicine      |
| Whitham, Steven Alan  | 4-4952/4-5531 | <a href="mailto:swhitham@iastate.edu">swhitham@iastate.edu</a> | Plant Pathology and Microbiology |
| Zhang, Jianqiang      | 4-8024        | <a href="mailto:jqzhang@iastate.edu">jqzhang@iastate.edu</a>   | VDPAM                            |
| Zhang, Qijing         | 4-2038        | <a href="mailto:zhang123@iastate.edu">zhang123@iastate.edu</a> | Vet Micro and Prev Medicine      |

## SUMMARY OF ADMINISTRATIVE FORMS

NOTE: For all forms:

**The Director of Graduate Education (DOGE)** is the IM Chair, Laura Jarboe (Chemical and Biological Engineering) 4134 Biorenewables Research Laboratory, [ljarboe@iastate.edu](mailto:ljarboe@iastate.edu), 294-2319).

**To obtain the DOGE signature on any documents, please leave the document with Dai**

**The Department/Program** is Interdepartmental Microbiology.

### **Add/Drop Slips**

Use to add/drop courses after the first week of classes

These yellow half-sheet forms are available at the Graduate College, in the IM Program office, and in departmental offices.

### **Request for Professional Advancement Grant (PAG)**

You can request funds from the Graduate College and the Graduate Student Senate (GSS) to attend and/or present at conferences and symposia. <https://www-gpss.sws.iastate.edu/professional-advancement-grants>

### **Request to Establish a Home Department**

Complete when you decide on your major professor and home department.

[http://www.grad-college.iastate.edu/common/forms/files/Request to Establish a Home Department for Students Admitted to Interdepartmental Majors.pdf](http://www.grad-college.iastate.edu/common/forms/files/Request%20to%20Establish%20a%20Home%20Department%20for%20Students%20Admitted%20to%20Interdepartmental%20Majors.pdf)

### **Recommendation for POS Committee Appointment Worksheet**

Complete when you have formed a POS Committee:

<http://www.grad-college.iastate.edu/common/forms/files/POSC.pdf>

### **Request to Change Committee Appointment**

Changes to POS Committee appointments can be made directly on the online POSC form through AccessPlus (<https://accessplus.iastate.edu/frontdoor/login.jsp>)

### **Program of Study and Committee Appointment online form (POSC )**

Should be completed by the end of the first year in your permanent lab. The online POSC form can be completed and submitted through AccessPlus.

<http://www.grad-college.iastate.edu/forms/forms.html>

Ideally all of the IM core courses and seminars should be listed first so that they can be easily checked for number of times taken. Additional courses can then be listed at the bottom of the form.

### **Modifications to the Program of Study**

Changes to your approved POSC (such as to add or remove courses) can be made on the POSC form directly in AccessPlus and submit for approval.

### **Request for Preliminary Examination**

Use this form to indicate your intent to take your preliminary examination. This form is now available on the Grad College website at [https://www.grad-college.iastate.edu/common/forms/student\\_forms.php](https://www.grad-college.iastate.edu/common/forms/student_forms.php). It must be completed and received by the Graduate College 2 weeks in advance of your preliminary examination. The **Preliminary Examination Report form** will be sent to the IM Program Coordinator who should then send it on to your major professor.

### **Graduation Deadlines**

This site provides the date deadlines by semester and the steps/forms necessary to graduate: <http://www.grad-college.iastate.edu/calendar/>

### **Application for Graduation (Diploma Slip)**

See above deadlines for due date and submit Application for Graduation via Accessplus: [http://www.grad-college.iastate.edu/common/forms/grad\\_app.php](http://www.grad-college.iastate.edu/common/forms/grad_app.php).

### **Thesis-Preliminary Format Check and Final Submission**

Thesis—Information on Abstract, Preliminary Format Checklist, Final Submission Checklist and Thesis sample pages can be found through this web site:

<http://www.grad-college.iastate.edu/current/thesis/>

See above graduation deadlines for due date

A copy of your thesis must be provided to each of your committee members at least three weeks prior to final oral examination.

**Request for Final Oral Examination** (See above deadlines for due date)

**This form must be turned into the Graduate College 3 weeks in advance of your final examination:**

[https://www.grad-college.iastate.edu/common/forms/student\\_forms.php](https://www.grad-college.iastate.edu/common/forms/student_forms.php). The **Final Examination Report form** will be sent to the IM Program Coordinator who should then send it on to your major professor.

### **Approval Slip for Graduation**

The Graduate College will send your department or major professor the Approval Slip with the "Report of Final Examination" form after your Request for Final Examination is received and approved.

Thesis Final Submission and Graduation Checklist

Includes information on deadlines

<http://www.grad-college.iastate.edu/current/thesis/checklist/>



## PROFESSIONAL ETHICS

It is imperative that you understand the ethical standards of science and conduct your scholarly activities accordingly. Scientists who commit unethical acts, whether from carelessness, ignorance, or malice, quickly lose the respect of the scientific community and/or are prevented from practicing science. Scientific misconduct includes such activities as: falsification of data, fabrication, deceptively selective reporting, purposeful omission of conflicting data with the intent to falsify results, plagiarism, representation of another's work as one's own, misappropriation of the ideas of others, the unauthorized use of privileged information, misappropriation of funds or resources for personal gain, and falsification of one's credentials. At ISU, these acts are taken very seriously and constitute "academic misconduct" (see ISU Graduate College Handbook). Individuals found guilty of academic misconduct may suffer a variety of penalties, up to and including expulsion from the university.

Occasionally, you may be faced with situations in which you are tempted to act in a manner you think might be unethical. If this occurs, we recommend discussing the situation with your major professor, or another professor whom you trust, to determine whether the actions you are considering are unethical. He or she should be able to suggest alternative actions that will be free of ethical questions.

Unfortunately, not all people understand or care about ethical issues and, at some time in your career, you may be witness to an act you believe to be unethical. When the individuals committing the presumed unethical acts are members of your own laboratory, or worse yet, individuals with power over you, such as your major professor, the situation can be very awkward and you must proceed cautiously. You will find yourself torn between a fear of retribution and a desire to stop the unethical behavior before it hurts you and other members of your laboratory.

If you believe that unethical behavior is going on in your laboratory, we recommend that you first attempt to discuss the situation informally with the person whom you think might be behaving unethically. Sometimes friendly questions will resolve the problem. If you feel uncomfortable in this approach, or if you have tried friendly approach and it didn't resolve the problem, we recommend that you discuss the situation informally with a professor whom you trust. You may also go directly to the Chair of Interdepartmental Microbiology or a member of the Interdepartmental Microbiology Supervisory Committee. All discussions with the Chair and the IM Supervisory Committee members will be confidential. You may also go directly to Associate Vice-Provost for Research who is responsible for investigating charges of academic misconduct on campus. No matter what you chose to do, you should take great care to ensure the rights of the individual whose actions you are questioning. Frivolous accusations of misconduct and vicious spreading of rumors are just as unethical as fabrication of data or plagiarism.

# LABORATORY SAFETY TRAINING

All new graduate students participate in OSHA Lab Standard Training. This Training can be conducted by the University Environmental Health and Safety Office (EHSO) (Ruth Book, Training, 294-8338) or the student can complete this requirement on-line by following these instructions:

**Go to:** <http://www.ehs.iastate.edu/cms/default.asp>

Click on: Learning Center Login:

LOGIN: using your University ID card number and password

Click on: On-Line Courses:

Take the following:

Chemical Hygiene Plan and Personal Protective Equipment (new format-Audio)

Fire Safety and Extinguisher Training

ISU-EPA Hazardous Waste Generator Online Training

NIH Guidelines

Biological Risk Assessment for Researchers

New graduate students will be required to participate in other lab safety training as scheduling by EHSO allows. This can include: Personal Protective Equipment, Radiation Safety: What Non-Radiation Laboratory Employees Need to Know, Hazardous Waste in the Laboratory: Five Critical Factors, and Fire Extinguisher Training. To register for these courses go to: [www.ehs.iastate.edu/](http://www.ehs.iastate.edu/).

Click on “On-Line Training Center”

Log-on

Click on “Register for Training/Training Calendar”. Note the months listed and look through the listings by month for next available classes. Places, dates and times for training will be listed. You should register for training as required and then attend the course.

# Interdepartmental Microbiology Governance Document

This document was approved by a vote of the Interdepartmental Microbiology program faculty on July 9, 2003 and updated by majority vote of Microbiology program faculty on June 29, 2017.

## I. Name of the Major

Microbiology

## II. Mission Statement

Microbiology is integral to global well being through its central role in agricultural productivity, human health, environmental quality and restoration, industrial processes, and food production and safety, as well as its contribution to a basic understanding of all living systems. The mission of the Graduate Program at Iowa State University is to advance scientific discovery in microbiology by providing education and research opportunities for future microbiologists.

### *The objectives of the major are:*

- To provide broad and robust graduate student training in Microbiology.
- To enhance the national and international reputation of Iowa State University in the field of Microbiology.
- To foster further intellectual exchange and research collaborations among Iowa State Microbiology faculty, students and staff.
- To provide a formal entity for seeking broad-based resources for the support of lecture series, retreats, graduate assistantships, postdoctoral fellowships and various graduate student prizes for excellence in Microbiological Research. This financial support will be sought from the participating Iowa State colleges, private donations, and national training grant awards.

## III. Program Description

The program includes, *but is not limited to*, prokaryotic and eukaryotic microbiology, virology, the interactions between microbes and animal, plant, and arthropod hosts, and the responses of those hosts to the microbes.

The program includes faculty from a variety of disciplines, university departments, and national laboratories.

## IV. Degrees Offered

Ph.D. in Microbiology  
Graduate minor in Microbiology  
M.S. in Microbiology, thesis format only

Details of the requirements for each degree are provided in the program handbook.

## **V. Relationship of the Interdepartmental Microbiology Major to Participating Departments**

Any department may participate in the Interdepartmental Microbiology program by supporting departmental faculty and student participation in the Microbiology graduate major.

Participating departments will benefit from new and stimulating research interactions with faculty and students from other cooperating departments and increased number and quality of graduate students.

Chairs of participating departments agree to support Microbiology in the following ways:

- 1) through recognition of time spent by faculty who actively participate in the operations of this interdepartmental major;
- 2) by support, as resources permit, of Microbiology graduate students working under the guidance of their faculty; and
- 3) by supporting and encouraging relevant course offerings by departmental faculty.

## **VI. Students**

Graduate students are the most important component of the Microbiology graduate program. Students will be recruited and selected competitively according to procedures established by the Microbiology faculty. Details of admission procedures, curriculum, rotations, exams and other requirements will be provided in the program handbook. Responsibility for maintaining and revising the Graduate Student Policies Document will reside with the Chair and Supervisory Committee. Major changes in the document will require approval of the Microbiology faculty.

## **VII. Faculty**

To be awarded a degree in Microbiology, a student's major professor must be a member of the Interdepartmental Microbiology program. Any faculty member at Iowa State University who is actively involved in microbiology research and graduate training may apply for membership in Microbiology. Membership must be renewed every five years.

Prospective faculty should submit applications to the Supervisory Committee, which will recommend actions to be taken to the Microbiology faculty at large. Information to be contained in the application and recommended standards for acceptance will be established by the Supervisory Committee. Acceptance of membership will be determined by a vote of the Microbiology membership. Faculty will be asked every five years if they would like to renew their membership.

## **VIII. Administration**

The Interdepartmental Microbiology graduate major is the responsibility of the Microbiology faculty and is administered by the Graduate College. The faculty elect a Chair, Associate Chair, and Supervisory Committee from their membership. The Chair is designated "director of graduate education" for the major and as such is the faculty member recognized by the Graduate College to be responsible for the day-to-day supervision of the major and the monitoring of student progress. The Chair signs for the major, appoints committees other than the Supervisory Committee and provides general leadership.

- ***Chair and Associate Chair***

A Chair elected by the Microbiology faculty will coordinate all activities of the Interdepartmental Microbiology program. The Microbiology Chair may reside in any participating department. The term of office for the chair will be two years.

The Chair's responsibilities include carrying out existing program policies, suggesting new policies, administering the budget, serving as a liaison with higher administration, coordinating the efforts of Microbiology committees, and supervising office staff. The Chair's responsibilities may be changed at any time at the discretion of the Supervisory Committee. The Chair may also assign responsibilities to other Microbiology Committees, the Associate Chair, faculty or staff; in this instance, however, the Chair will assume responsibility for assuring that the tasks are performed satisfactorily.

The duties of the Associate Chair are to share in administrative duties, as assigned by the Chair. This will relieve the Chair of some duties, provide training for the Associate Chair, and provide more administrative continuity in the program.

Elections for Associate Chair (future Chair) will be held every two years and will be administered by the Supervisory Committee. The Associate Chair serves for two years and then becomes Chair for a term of two years.

Nominations for Associate Chair/Chair will be solicited from the Microbiology membership and nominees willing to serve will be voted upon by the membership. The Supervisory Committee has responsibility for assuring high quality nominations. During this process the Supervisory Committee (or appointed nomination committee) will consult with the Graduate College. Elections should be held by May 15; terms will start on July 1.

- ***Supervisory Committee***

A Supervisory Committee will be responsible for review of all aspects of the program, for guiding the establishment of policy, for interpreting and implementing policies that have been established by the Microbiology membership, and for advising the Chair.

In all decisions, each member, including the Chair, will have one vote. In case of disagreements between the Supervisory Committee and the Chair, the Supervisory Committee will have final authority. In the case of disagreements between the Supervisory Committee and the faculty, the faculty view, as determined by referenda, will prevail.

*Voting Membership* - The Supervisory Committee will include the Chair, Associate Chair, *ex officio* chair, and the chairs of any sub-committees.

Terms will start on August 1. The Supervisory Committee may appoint a Microbiology member on a temporary basis to complete any unfinished term of a Committee member or Associate Chair, or to substitute for a Committee member or Associate Chair on leave.

*Non-voting Membership* –All Principal Investigators (PI) or Program Directors (PD) on all training grants obtained for the purpose of supplying stipends for majors in

Microbiology will serve as non-voting members of the Supervisory Committee. The president of the Microbiology Graduate Student Organization (MGSO), or a designated representative, will also serve as a non-voting member.

Meetings - To ensure good communication between the Chair and the Supervisory Committee, the Supervisory Committee should meet monthly, preferably at a regularly scheduled time. It is the responsibility of the Chair to call the meetings; if the Chair is not available, the Associate Chair may call the meetings.

- ***Committees***

Committees of Microbiology Faculty will be established as needed to perform tasks and advise the Chair on matters such as student admissions, curriculum, academic standards and faculty membership. The Chair will appoint members and chairs of these committees. The number, membership, and responsibilities of the committees may be modified at any time at the discretion of the Chair. In cases of disagreement between a Committee and the Chair, the Supervisory Committee will have final authority.

- ***Faculty Meetings***

Full faculty meetings should be held at least once per year to update faculty on Microbiology activities and to discuss issues of importance to the group. It is the responsibility of the Chair to call the meetings; if the Chair is not available, the Associate Chair may call the meetings.

- ***Establishment of Policies***

All policies modifying core-course requirements and changes to this document must be approved by a majority of the total Microbiology membership. All other policies may be established by a vote of the Supervisory Committee. However, the Supervisory Committee should consult with the faculty when making significant policy decisions and should hold referenda for policy changes likely to be controversial. In addition, all policy decisions by the Supervisory Committee must be announced to the faculty; if three or more faculty object to a policy, a referendum must be held to determine its acceptance or rejection. Referenda on such policies will be determined by a simple majority of the votes cast; at least 50% of the Microbiology faculty must vote for a referendum to be valid.

- ***Elections and Referenda***

All elections and referenda will be determined by a majority vote of the Microbiology faculty who respond to the call for votes; at least 50% of the membership must vote for an election or referendum to be valid.

## **IX. Amendment of Governance Document**

Amendment of this document requires a simple majority vote of the total Microbiology faculty.

## DISMISSAL CRITERIA

Continuing registration as a graduate student at Iowa State University is contingent on maintaining good standing in a graduate major. The Interdepartmental Microbiology (IM) Program expects that students in the Microbiology major will complete their degrees in a satisfactory and timely manner. However, there are several situations that may require severing the relationship between the IM Program and a student.

### 1. Dismissal Criteria

A student may be dismissed, that is, removed from their degree program and not permitted to register as an IM student, for the following reasons:

#### *a. Failure to progress satisfactorily in his/her degree program*

This may be evidenced by a lack of research progress, a lack of aptitude for microbiology, or a failure to maintain a satisfactory academic standing, as defined by the Iowa State University Graduate College Handbook.

#### *b. Lack of a major professor*

Because graduate degrees in Microbiology at Iowa State are centered about mentored research projects, it is impossible to complete a degree without a research mentor, i.e., a major professor. To maintain good standing and earn a degree in Microbiology, a student must have an IM faculty member serving as his or her major professor.

A student admitted to IM on rotation has up to 6 months (M.S.) or 12 months (Ph.D.) from the date of entry into the program to find a faculty member willing to serve as his or her major professor (unless otherwise designated at the time of admission). If the student desires, the IM Chair will help the student search for a major professor; however, final responsibility for finding a major professor rests with the student.

Occasionally, faculty members who have previously agreed to serve as major professor become unable or unwilling to serve. Common reasons include ill health or a change in job status by the faculty member, or poor performance by the student, such as described in Section 1a. Faculty desiring to terminate their service as major professor may do so by notifying the student and the Chair in writing. A student who has lost his or her major professor has up to three months after the date the Interdepartmental Microbiology Chair is notified to identify another faculty member willing to serve. The Chair will help the student search for a new major professor, if the student so desires; however, the responsibility for finding a faculty member willing to serve as major professor rests with the student and success cannot be guaranteed.

#### *c. Academic dishonesty*

The proper conduct of science requires the highest standards of personal integrity. Because of this, dishonesty in the classroom or in the conduct of research is considered a serious offense by IM and by the University. Students accused of academic dishonesty will be dealt with according to the procedures outlined in the University Catalog and the Faculty Handbook. Possible punishments can include dismissal from the program and expulsion from the University, depending on the severity of the offense.

### 2. Dismissal Procedures

A student's POS committee, or if the student has no POS committee, the student's major professor, Temporary Graduate Advisor, or a member of the IM Supervisory Committee can recommend the dismissal of a student for any of the reasons listed above. Recommendations for dismissal are made to the IM Chair and are acted upon by the IM Supervisory Committee.

Procedures for dismissal are as described in the Iowa State University Graduate College Handbook. Before a dismissal is decided, the IM Chair must give the student a written justification for why dismissal is being considered. The IM Chair must also discuss the situation with the student, with the IM Supervisory Committee, and with his or her POS committee and major professor (or Temporary Graduate Advisor) in attempt to find a satisfactory resolution. These discussions constitute the "informal conference" as described in the Graduate College Handbook. If a satisfactory resolution cannot be reached and the Supervisory Committee votes to dismiss the student, either party may bring the issue to the attention of the Associate Dean of the Graduate College for a decision. The student may appeal the decision of the Associate Dean, as described in the Graduate College Handbook.

### 3. Responsibilities of the IM Program and the Major Professor

It is the responsibility of the IM Program to counsel students who are having academic difficulties, to help students search for an acceptable major professor, or if students are unable to overcome these difficulties, to help the students identify and apply to other appropriate degree programs. It is the responsibility of the major professor to seek funds for a student's assistantship and for the conduct of research. Students performing satisfactorily can normally expect two years of

support as either RA or TA for an M.S. degree, three years for a Ph.D. with a prior M.S., and five years for a Ph.D. without a prior M.S.; however, funding cannot be guaranteed.

#### **4. Relationship between Status in IM and Termination of Financial Support**

Although students in IM are normally supported on graduate assistantships, this is not a requirement for continued participation in the major. Students not on assistantship will continue to have regular status in the major so long as they have a major professor, remain in good standing, and are registered. However, because assistantship support at Iowa State requires that a student be a member of a graduate program, dismissal from IM requires that assistantship support be terminated, unless the student is able to transfer to another graduate program at ISU.

Students with any doubt about their assistantship status should discuss their situation with their major professor, the IM Chair, and/or the entity providing their assistantship support. For further information on termination of assistantship appointments, see the Graduate College Handbook.

#### **5. Appeal Process**

The University has established appeal processes for student grievances. These vary depending on the nature of the grievance and are described in the Graduate Handbook. Generally, these procedures begin with the program chair. It is usually best for all parties if a satisfactory resolution can be reached without initiating a formal appeal process. The Associate Dean of the Graduate College is available to informally consult with students and faculty.



## **NONDISCRIMINATION AND SEXUAL HARASSMENT POLICIES**

Complete information can be found at: <http://policy.iastate.edu/policy/discrimination/>

Selections from Iowa State University Discrimination and Harassment Policy follow:

Iowa State University prohibits discrimination, which can include disparate treatment directed toward an individual or group of individuals based on race, ethnicity, sex, pregnancy, color, religion, national origin, physical or mental disability, age (40 and over), marital status, sexual orientation (including gender identity), status as a U.S. Veteran (disabled, Vietnam, or other), or other protected class, that adversely affects their employment or education.

Iowa State University also prohibits harassment, which can be a form of discrimination if it is unwelcome and is sufficiently severe or pervasive so as to substantially interfere with a person's work or education. Harassment may include, but is not limited to, threats, physical contact or violence, pranks, jokes, epithets, derogatory comments, vandalism, or verbal, graphic, or written conduct directed at an individual or individuals because of their race, ethnicity, sex, pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation (including gender identity), or U.S. veteran status. Even if actions are not directed at specific persons, a hostile environment may be created when the conduct is sufficiently severe, pervasive or persistent so as to unreasonably interfere with or limit the ability of an individual to work, study, or otherwise to participate in activities of the University.

It is the University's goal to prevent the occurrence of discriminatory and harassing activity and to promptly stop such conduct. While grounded in state and federal non-discrimination laws, this policy may cover those activities which, although not severe, persistent, or pervasive enough to meet the legal definition of harassment, are inappropriate and unjustified in an educational or work environment. This policy will be interpreted so as to avoid infringement upon First Amendment rights of free speech. The University must be mindful of the tradition of academic freedom that includes the free exchange of ideas inherent in an academic community. A determination as to whether discrimination or harassment has occurred will be based upon the context in which the alleged conduct occurs.

### **Complaint Resolution**

In an effort to prevent or stop discriminatory or harassing behavior, the University has adopted specific avenues through which an individual can make his or her complaint known. With issues of discrimination and harassment, it is important to identify and remedy the situation as soon as possible. For this reason, the University has adopted two complaint resolution mechanisms for discrimination and harassment concerns - informal and formal resolution. Claims of discrimination and harassment must be brought either as an informal complaint or a formal complaint to ensure that appropriate action can be taken right away. An informal complaint may, but need not be made before filing a formal complaint; however, once a formal complaint has reached resolution, the same complaint cannot be brought as an informal complaint.

To best remedy a situation, complainants are urged to promptly share concerns or complaints rather than risking their well-being or negatively affecting the University's ability to investigate their case due to the passage of time and potential departure of witnesses. If a formal complaint contains incomplete information, the Office of Equal Opportunity and Diversity will promptly seek to gather the

needed information from the complainant. In the event that such information is not furnished to the Office of Equal Opportunity and Diversity within 30 days from the date of the request, the case may be closed. Consistent with federal regulations governing the filing of complaints, the Office of Equal Opportunity and Diversity may decline to investigate claims in which none of the alleged discrimination or harassing action occurred within the preceding 300 days.

Any employee, student, visitor, applicant, or program participant of Iowa State University may file a complaint alleging discrimination or harassment in violation of the University's policy prohibiting such conduct. In most cases, complaints against affiliates or contractors of Iowa State University must first proceed through the affiliate or contractor before Iowa State University may intervene. Information about the University's policy and resolution procedures may be found in several offices, including the Dean of Students Office, the Student Counseling Service, the Women's Center, the Employee Assistance Program, and the Office of Equal Opportunity and Diversity. As described at the above web site, the University has designated and trained certain individuals, called Sexual Harassment Assistors, to assist a potentially injured person in deciding if and how to proceed and in carrying out that decision.

### Confidentiality

Persons seeking general information or guidance about harassment or discrimination may be concerned about whether the information they share with another person will be confidential. While the university is eager to create a safe environment in which individuals can be unafraid to discuss concerns and make complaints, legal obligations may require the university to take some action once it is informed that harassment or discrimination may be occurring. Because of their positions of authority, certain university personnel--i.e., central administrators, deans, directors, department chairs, supervisors, and managers--are particularly obligated to take action when they receive a complaint of harassment or discrimination. Although the confidentiality of the information received and the privacy of the individuals involved cannot be guaranteed, they will be protected to as great an extent as is legally possible. The expressed wishes of the complainant regarding confidentiality will be considered in the context of the university's legal obligation to act upon the charge and the right of the charged party to be informed concerning the charge.

## **DIVERSITY AT IOWA STATE UNIVERSITY**

The Office of Equal Opportunity and Diversity (EOD) is located at 3350 Beardshear Hall, right off the elevator. <http://www.hrs.iastate.edu/diversity/>

ISU defines diversity as that quality of its physical, social, cultural and intellectual environment which embraces the rich differences within the multiplicity of human expression and characteristics including age, culture, ethnicity, gender identification and presentation, language and linguistic ability, physical ability and quality, race, religion, sexual orientation, and socioeconomic status. "In order for affirmative action or diversity to work, there has to be an environment that welcomes it, not just tolerates it", Carla R. Espinoza, Associate Vice President, Human Resources Services, Director, Equal Opportunity & Diversity, January, 2006.

On-line training for courses such as Diversity, Harassment and Discrimination and Drug Free Workplace are now available through ACCESS PLUS.

"Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Diversity, 3210 Beardshear Hall, (515) 294-7612."

## **FELLOWSHIP OPPORTUNITIES** (that we know about)

**Graduate Research Fellowship Program (GRFP)** Brief overview is below; please go to the website for complete details. [http://www.nsf.gov/funding/education.jsp?fund\\_type=2](http://www.nsf.gov/funding/education.jsp?fund_type=2)

Synopsis of Program: The National Science Foundation aims to ensure the vitality of the human resource base of science, technology, engineering, and mathematics in the United States and to reinforce its diversity by offering approximately 1,000 graduate fellowships in this competition. The Graduate Research Fellowship provides three years of support for graduate study leading to research-based master's or doctoral degrees and is intended for students who are at the early stages of their graduate study. The Graduate Research Fellowship Program (GRFP) invests in graduate education for a cadre of diverse individuals who demonstrate their potential to successfully complete graduate degree programs in disciplines relevant to the mission of the National Science Foundation.

The three eligibility requirements for the Graduate Research Fellowship Program -- citizenship, degree requirements, and field of study – are described. Applicants are advised to read the entire program solicitation carefully to be sure that the requirements are interpreted properly. Applicants must exercise judgment in assessing eligibility. Applicants must be United States citizens or nationals, or permanent resident aliens of the United States. Fellowships are intended for individuals in the early stages of their graduate study. Applicants must have completed no more than twelve months of full-time graduate study at the time of their application. Fellowships are awarded for graduate study leading to research-based Master's or doctoral degrees in the fields of science, technology, engineering, and mathematics supported by the National Science Foundation (See NSF-Supported Fields of Study). The NSF welcomes applications for interdisciplinary programs of study and research.

**GEM:** <http://www.gemfellowship.org/> Graduate Fellowships for Minority Students

The mission of The National GEM Consortium is to enhance the value of the nation's human capital by increasing the participation of underrepresented groups (African Americans, American Indians, and Hispanic Americans) at the master's and doctoral levels in engineering and science. We prepare technical leaders for advanced careers in industry, academia, and government agencies by identifying and selecting highly qualified GEM Fellows to complete a program of graduate study and internships. Through our university and employer members, and other strategic partners, GEM develops funding to award fellowships and builds mentor networks to support Fellows in achieving academic and professional success.

On-Line availability of funding resources:

<http://www.ospa.iastate.edu/>

The office of Sponsored Programs (OSP) located at 1138 Pearson Hall (294-5225) assists students seeking fellowships and research funding from sources outside the university (state, federal, and private agencies). OSP maintains a library of directories and other materials on fellowships and grants and publishes listings of funding opportunities in each edition of the University Newsletter.

Information on financing can be accessed via the Internet at [http://pivot.cos.com/funding\\_main](http://pivot.cos.com/funding_main).