

BMB 488 Communities of Practice in Biochemistry and Molecular Biology  
Section 006: Host-Microbe Interactions  
2 credits  
Fall 2018  
302 Boucke Building  
M 9:05 AM-9:55 PM

**Instructors:**

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**Goals:** The goal of BMB 488 Host-Microbe Interactions is to acquire a general understanding of how microbes, such as bacteria and parasites, can interact specifically with higher organisms to influence host physiology and, in some cases, cause disease. This goal will be achieved by integrating primary research with key concepts of the discipline, including scientific inquiry, experimental design, research article discussion, poster and oral presentation, proposal preparation, and bioethics. In this course, the students will:

- 1) Develop the ability to identify important scientific questions and pose them in a way that can be addressed experimentally.
  - a) Students will be able to acquire sufficient information from reference sources, reviews, and primary literature to identify key questions in the field that have not been answered to their satisfaction.
  - b) Students will be able to determine what new information is needed to address an open question, and what experiments are appropriate to test key aspects of the question.
- 2) Learn how to communicate scientific objectives, data, and conclusions.
  - a) Students will write a 2 page project proposal at the beginning of the semester using NSF predoctoral fellowship guidelines.
  - b) Students will present their research data in a poster session.
  - c) At the end of the semester, students will give a 15 minute talk on their research.
  - d) During the seminar, students will practice learning and communicating their critical thoughts in a peer group.
- 3) Develop the ability to gather, evaluate, and organize information outside a classroom setting.
  - a) Students will learn how to identify appropriate sources for scientific knowledge and evaluate their relative quality.
  - b) Students will learn how to read and interpret articles from the primary scientific literature. They will be able to identify the hypothesis, to critically evaluate the results and conclusions, and to relate information from an article to their own research.
  - c) Students will learn and use the proper methods for citing sources.
- 4) Understand the societal implications of research.
  - a) Students will be able to articulate the broader impacts of research projects related to the course section.
  - b) Students will include a broader impact statement in their project proposal.
- 5) Acquire an understanding of ethical analysis as it applies to science, including the responsible conduct of research and ethical applications of science to society.
  - a) Students will be able to identify ethical issues pertinent to an area of scientific research.

- b) Students will be able to identify stakeholders and their objectives.
- c) Students will be able to analyze the situation from different ethical perspectives.
- 6) Master research experimentation skills.
  - a) By working in a community of practice, students will learn from scientists with different levels of experience how to design, execute, and interpret experiments.

**Research:** Students will learn fundamental concepts of biology and experimental design by acting as an independent primary researcher within a community of practice, a group of scientists from many levels of experience working toward a shared goal. A minimum of 5 hours/week doing primary research in the assigned laboratory is required.

- At the beginning of the semester, students will write a short, 2 page paper describing the goal of their research project, the hypothesis to be tested, and the experimental approach to be used. First draft of a research plan will be due September 17, with final revision due September 24.
- At the end of the semester, students will give oral presentations on their research.

### **Seminar:**

The major focus of the seminar will be on the scientific issues related to host-microbe interactions. Students will direct this aspect of the course and, as a group, choose topics for investigation in consultation with the instructors. Students will also learn how to gather information outside a classroom (how to evaluate the reliability of a source, and what constitutes evidence as opposed to opinion) and how to synthesize and present material to their peers. At the end of the semester, students will make oral presentation on their research projects.

### **Grading:**

Laboratory research 50%: the laboratory part of the grade will be based on productive participation in the community of practice, including following the relevant safety protocols and experimental procedures. This portion will be assessed by the supervising faculty member.

Seminar 50%: The seminar grade will be based on the student's preparation for and participation in the discussions both in class (30% of the course grade). The written proposal and oral presentation will each constitute 10% of the course grade. Since part of the grade is based on participation, attendance in class is critical. If you cannot come to a meeting of the seminar due to a valid excuse such as a documented illness, you must contact one of the instructors as soon as possible, preferably before the missed class.

### **Relevant Policies of the Pennsylvania State University:**

#### **The Eberly College of Science Code of Mutual Respect and Cooperation**

(<http://science.psu.edu/climate/code-of-mutual-respect-and-cooperation>) embodies the values that we hope our faculty, staff, and students possess and will endorse to make The Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded.

**The Eberly College of Science is committed to the academic success** of students enrolled in the College's courses and undergraduate programs. When in need of help, students can utilize various College and University wide resources for learning assistance.

(<http://www.science.psu.edu/advising/success>)

**Penn State welcomes students with disabilities into the University's educational programs.** If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at (<http://equity.psu.edu/ods/>). In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at (<http://equity.psu.edu/ods/guidelines>)). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

**Academic Integrity:**

All Penn State policies regarding ethics and honorable behavior apply to this course (see links below for policy statements). Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. All University policies regarding academic integrity apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. For any material or ideas obtained from other sources, such as the text or things you see on the web, in the library, etc., a source reference must be given. Direct quotes from any source must be identified as such. All exam answers must be your own, and you must not provide any assistance to other students during exams. Any instances of academic dishonesty WILL be pursued under the University (<https://handbook.psu.edu/content/academic-integrity>) and Eberly College of Science (<http://science.psu.edu/current-students/Integrity/index.html>) regulations concerning academic integrity.

**Counseling and Psychological Statement:**

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

Counseling and Psychological Services at University Park (CAPS)

(<http://studentaffairs.psu.edu/counseling/>): 814-863-0395

Counseling and Psychological Services at Commonwealth Campuses

(<http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/>)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400

Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

**Educational Equity/Report Bias Statement:**

Consistent with University Policy AD29, students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined on the [University's Report Bias webpage](http://equity.psu.edu/reportbias/) (<http://equity.psu.edu/reportbias/>)