CAMB705: Advanced Topics in Bacterial-Host Interactions
Wednesday 3:30-5pm from January 19, 2022 until March 23, 2022
Location: Johnson Pavilion room 209

Course Co-Directors:
Igor Brodsky
Associate Professor of Pathobiology
ibrodsky@vet.upenn.edu
215-746-8426 (office)

Sunny Shin
Associate Professor of Microbiology
sunshin@pennmedicine.upenn.edu
215-746-8410 (office)

Course Description: This course will delve into specific topics in general area of bacterial pathogenesis and bacteria-host interactions. We will explore key historical and current papers on topics related to bacterial invasion of and replication within host cells, bacterial interference with host cell signaling pathways, bacterial interactions with host mucosal tissues, and the role of bacterial colonization in shaping and instructing host immune responses. Each week, a student will lead the class in the discussion of a published paper on a specific topic. The format of each class will be a 10-15-minute introduction of the key background and underlying questions to be presented by a student, followed by a student-led analysis of the data presented in the research article involving participation by all members of the class. Students will be graded based on their presentation and active participation in the paper discussions. The papers listed below are recommendations. If students have alternative papers that they would like to present and discuss, please feel free to email your suggestions to Sunny and Igor.

Prerequisites: Strong background in cell biology, immunology and/or bacteriology fulfilled by 1st year CAMB courses. Course is limited to 2nd year and above doctoral students or advanced undergraduates with course director’s permission.

The class will meet once per week for 1.5 hours, and will discuss 1 key papers for each topic, as well as relevant background.

Course Goals
Students who complete this course successfully will have gained:
- An in depth understanding of bacterial-host interactions
- Ability to discuss and analyze relevant primary articles in-depth

We respectfully ask that all members of our class work together to establish a supportive and inclusive environment that is welcoming for all, regardless of their race, ethnicity, gender identity, sexuality, religious beliefs, physical or mental health status, or socioeconomic status.

We would like our class to be a welcoming and safe space for everyone. We ask that everyone try their best to be respectful in their speech and actions, be considerate of others, and refrain from demeaning, discriminatory, or harassing behavior and speech.

It is also important to us that everyone who participates in this class has the resources to do so. Please let us know if you need any special accommodations in the curriculum, instruction or assessments of this course to enable you to participate fully. We will make a full effort to maintain the confidentiality of any information that you share with us.

Attendance Policy
Students are expected to attend the classes and paper discussions, as participation is an important aspect of the course. We understand that things can happen during the semester that may prevent
you from attending class. In that case, we ask that you contact us ahead of time to let us know if you are unable to attend.

**Topics to be discussed:**

**Jan 19: General course background; introductory lecture on bacterial:host interactions**

**Background reading:**


**Jan 26: Bacterial survival within the host cell: hijacking the host cytoskeleton**

**Discussion Paper:**


**Background Paper:**


**Feb 2: Bacterial secretion systems: intra-kingdom communication devices – Type III secretion**

**Discussion paper:**


**Background Paper:**


**Feb 9: Bacterial secretion systems: intra-kingdom communication devices – Type IV secretion**

**Discussion Paper:**

Background:

Protein-Injection Machines in Bacteria. Galán JE, Waksman G. Cell. 2018 Mar 8;172(6):1306-1318 (read section pertinent to type IV secretion)

Feb 16: Life within the cell: Discovering the host targets of T3SS effectors

Discussion Paper:

Background Paper:

Feb 23: Bacterial toxins and cell-surface receptors

Discussion Paper:

Background Papers:


March 2: Setting up a persistent bacterial infection

Discussion Paper:

Background Papers:
Helicobacter and salmonella persistent infection strategies. Monack DM. Cold Spring Harb Perspect Med. 2013 Dec 1;3(12):a010348. (Read the section on Salmonella)
March 9: Bacterial invasion and spread: crossing the blood-brain barrier.

Discussion Paper:


Background Papers:


March 16: Immune detection of bacterial virulence activity- Effector-triggered immunity

Discussion Paper:


Background Paper:


March 23: Interbacterial competition within the inflamed gut

Discussion Paper:


Background Paper:
