

BB 4900-A23
Professor Srinivasan

Brain, Gut and Mental health

Have you ever had a "gut-wrenching" experience? Do certain situations make you "feel nauseous"? The gut-brain connection is no joke; it can link anxiety to stomach problems and vice versa. More importantly, the gastrointestinal tract is sensitive to emotion. Anger, anxiety, sadness, elation — all these feelings (and others) can trigger symptoms in the gut. In this capstone course, we will study the different pathways of the Gut-Brain Axis and discuss how the brain has a direct effect on the stomach and vice versa. So, come and find out what it really means to have felt "butterflies" in your stomach?

BB 4900- B23
Professor Bakermans

Analyses in Wildlife Ecology and Conservation

Through small group discussions, student-led inquiry, and in-class presentations, students will use primary literature to learn and apply data analysis techniques in wildlife ecology and conservation. In this capstone course, students will examine openly published datasets, like in the Dryad data repository, that are analyzed in recent journal articles. While engaging in current topics of conservation, students will learn and practice evaluating statistical analyses and recreating analyses using the programming language R. Data analysis topics may include comparisons of descriptive statistics, tests for categorical variables (e.g., chi-sq), tests for a single numerical variable (e.g., t-test), tests for multiple numerical variables (e.g., linear regression), and an introduction to more advanced (e.g., nonparametric) topics.

BB4900-C24
Prof. Natalie Farny

Nucleic Acid Therapies

Nucleic acid therapeutics are treatments that are based on delivery of nucleic acids (DNA and RNA), or closely related chemical compounds, to human cells. While there are only a few FDA-approved nucleic acid therapies currently in clinical use, dozens more are in clinical trials, and countless others are being developed and studied in the lab. Through in-depth analysis of the latest primary literature, class discussions, and group problem solving, students will learn the mechanism of action and clinical applications of several key therapeutic modalities, including: antisense oligonucleotides, small interfering RNAs, ligand-binding aptamers, adeno-associated

viral vectors, and synthetic mRNAs.

Students should have a strong foundational knowledge of genetics, cell biology, and molecular biology as would be obtained from BB2550, BB2920, and BB2950.

BB4900-D24

Professor Jill Rulfs

The Biotechnology of "Biologics"

What are they? What makes them different from other drugs? How are they made, used, approved?

We will investigate these questions through the primary scientific literature. We will also gain some understanding of the FDA process of approval for use in clinical trials and commercial distribution, including risks, benefits, safety, and efficacy. In true capstone fashion, we will use our collective knowledge of cell biology, genetics, immunology, protein purification, and bioethics to explore and understand this relatively new and commercially expanding category of medical therapeutics. Students should come to the course ready to read, explore and discuss.