

Junction 2013 Seminar Classes, Week 1

Tuesday 7/9

Psychology of Positive Experience

Amy



While I can't promise that I can teach you never to be sad or disappointed again, I can point you towards scientific research on the nature of happiness and the kinds of strategies that we can adopt to make our lives more fulfilling.

Space Mission Design

Elizabeth



Landing a robot on Mars is tricky business. Bringing one back is even tougher. Come learn about how space missions go from paper to launchpad, understand why cooperation and communication are so important in space exploration, and apply what you've learned as you tackle the Junction Space Mission Design Challenge!

Evolution of Cooperation

Katherine



Evolution has frequently been described as the survival of the fittest, a war of all against all. Yet all around us are examples of cooperation, from the microbes that live in our gut, to ant colonies, to our own complex societies. What makes cooperation possible, and even advantageous? In this class, we'll play games involving the famous Prisoner's Dilemma and test our own strategies for conflict and cooperation.

Foundations of Quantum Mechanics

Lucy



Quantum mechanics has a reputation for being a bizarre theory, where particles seem to be in multiple places at once, measurement can fundamentally disrupt a system, and faraway particles can be "entangled" with each other. Are these claims really true? What is quantum mechanics, anyway? We'll look at some simple but profound thought experiments to examine the core tenets of quantum mechanics, and we'll also discuss the tricky philosophical problems associated with quantum mechanics that physicists still disagree about today.

Eek! Parasites!

Lydia



Parasites they crawl, suck, bite, and eat almost always at the expense of the host. Learn how parasites are nightmares for humans, plants, and animals alike, and join us for a look inside the world of parasitic creatures, if you can stomach it.

Engineering Pharmaceuticals

Rachel



Ever wonder what those tablets you consume when you are feeling ill are made of? What about how they are made? Learn about current ways that drugs are produced and what researchers are doing to improve these processes.

Linguistics: a Too-Brief Introduction to the Psychology and Philosophy of Language

Amy



Let's stop for a moment and appreciate how strange, awesome, and interesting it is that the humans you know (even the ones you strongly dislike) can use language. They learned and can follow a complex set of rules (grammar), catch subtle inferences (syntax), and understand abstract references and relationships- all without thinking about it. In this class we'll play some games and look at some psychological studies that help us appreciate just how complicated language truly is.

Defying Gravity

Elizabeth



"It's time to try defying gravity!" said Orville, Wilbur, and Elphaba. "My Third Law will help!" exclaimed Newton in reply. Come learn how giant funny-shaped chunks of metal with people and packages inside defy gravity every day. We'll talk about why commercial aircraft look the way they do and how they fly.

Small Things Considered: Kitchen Edition

Katherine



Cheese, yogurt, bread, beer, miso - nearly every human society has some sort of culinary partnership with the microbes that live around us. Come learn about the tiny organisms in our kitchens, and sample some of their creations as well.

Applications of Fourier Analysis

Lucy



How can telescopes produce clear images of galaxies many light-years away? Why do different instruments playing the same note sound so different? How can large photos be compressed for fast transmission over the internet? How do seismologists distinguish between earthquakes and nuclear blasts? What do all of these things have in common? Come learn the answers to all of these questions, and more!

Prerequisite: Knowledge of high school trigonometry recommended.

The Science of Explosions

Rachel



Ever wondered what makes things blow up? Understanding the science behind explosions is both exciting and important to our safety. Learn about all types of explosions from fireworks to bombs to thundersnaps and indulge your inner pyro!