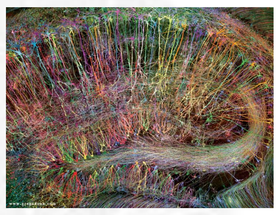
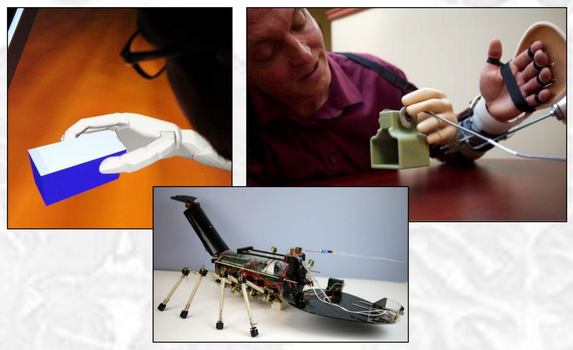
The Interdisciplinary Major in Neuroscience

Bridging the fields of Biology, Psychology, Chemistry and Philosophy

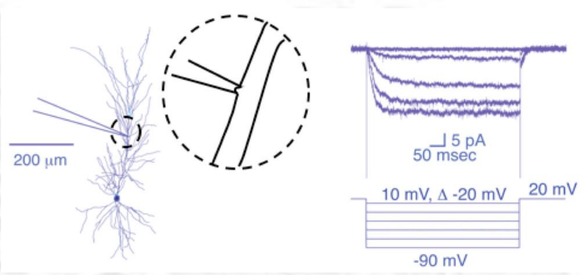


Program Committee:

Daniel Blustein – Psychology
David Kabelik – Biology (chair)
Dr. Kelly Dougherty – Biology
Dr. Rebecca Klatzkin – Psychology
Dr. Julia Haas – Philosophy
Dr. Tanushree Pandit – Biology
Dr. Jason Haberman – Psychology
Dr. Larryn Peterson – Chemistry



Dr. Blustein studies how organisms move and interact with their environments. He uses psychophysics, behavioral analysis and computational modeling to explore sensory-motor processes. Applications span robotics, prostheses and neurorehabilitation.

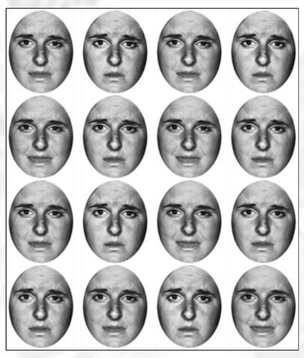


Dr. Dougherty investigates the biophysical mechanisms of antiepileptic drug (AED) action. She uses electrophysiological techniques to understand how AEDs directly influence the ionic currents flowing across the neuronal membrane (pictured above).

PHYSICAL GOOD: STEAK	
Determinants	
Commodity	Steak
Cost	€25
Time delay	40 minutes
Risk	Low
Motivational state	Hungry
Impatience	Medium

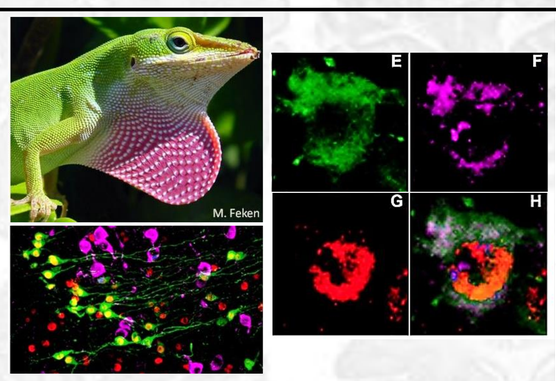
Example of a physical good, together with possible determinants of choice.

Dr. Haas works in the philosophy of cognitive science. She particularly focuses on theories of valuation and decision-making. Her recent work examines the mechanisms underlying normative cognition and constraint.



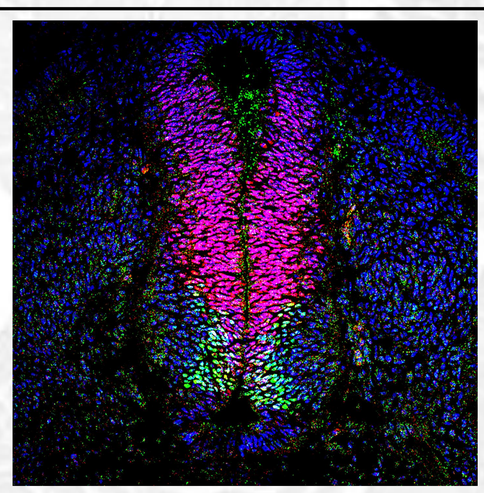
Happier or sadder than average?

Dr. Haberman's interests are in visual cognition. He uses psychophysics to explore how the brain represents crowds of objects, such as faces. The visual system uses averages (e.g., average expression) to derive information about the natural world.

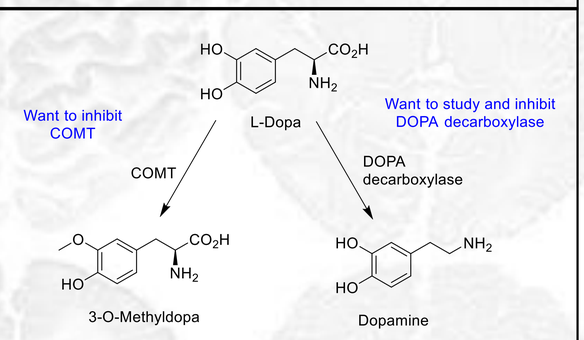


Dr. Kabelik examines neuroendocrine circuitry regulating social behaviors, using lizards as simple vertebrate model systems. Studies utilize hormone analysis, pharmacology, behavioral observation, detection of neural markers, and molecular approaches.

Dr. Klatzkin examines the physiological and psychological mechanisms underlying stress-induced eating in women.



Dr. Pandit examines signaling mechanisms contributing to neural fate patterning and neural circuit formation during embryonic development.



Dr. Peterson synthesizes dopamine derivatives and related catechols 1) to serve as inhibitors of important enzymes involved in brain chemistry; and 2) to better understand the requirements of enzymes responsible for the biosynthesis and metabolism of dopamine.

Core Requirements *(take all)*

Chem 120&125L	Foundations of Chemistry & Lab (offered both fall & spring)
Biol 130&131L	Biology I & Lab (offered in fall, F7 course)
Biol 140&141L	Biology II & Lab (offered in spring)
Psyc 150	Foundational Issues In Psychology (offered both fall & spring, F8 course)
Psyc 211 or Math 211	Statistical Methods (offered both fall & spring, F6 course)
Neur 270	Neuroscience (prerequisite: Biol 130 and 140, or Psyc 150, offered both fall & spring)
Neur 485/486	Senior Seminar (offered in spring, sometimes also fall)

Depth Requirements *(take one Biol and one Psyc)*

Biol 375+Lab	Neuroendocrinology (prerequisite: Biol 130 and 140, usually offered in fall)
Biol 376+Lab	Molecular and Cellular Neuroscience (prerequisite: Biol 130 and 140, usually offered in spring)
Psyc 344+Lab	Movement Neuroscience (prerequisite: Psyc 150)
Psyc 345+Lab	Cognitive Neuroscience (prerequisite: Psyc 150)

Breadth Requirements *(take two, or one plus a third depth)*

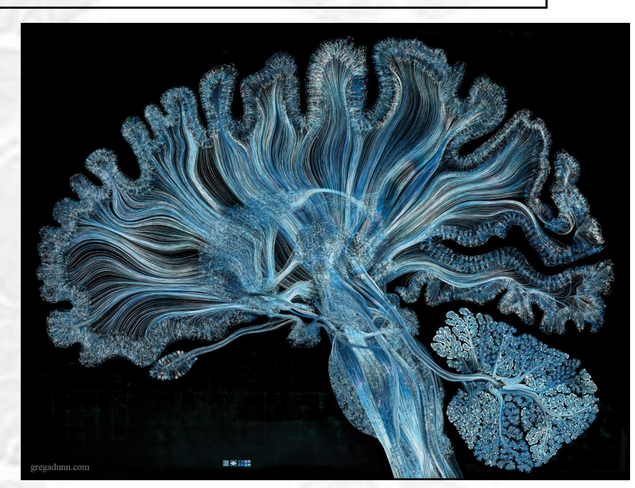
Chem 411+Lab	Medicinal/Computational Chemistry (must choose Neuroscience-related independent project, offered in spring)
Neur 451/452	Independent Research in Neuroscience (4 credits total)
Phil 330	Philosophy and Neuroscience (F1 course, no prerequisites)
Phil 340	Philosophy and Cognitive Science (F1 accreditation pending, no prerequisites)
Psyc 318	Clinical Neuroscience

Electives *(choose two from the following list, or substitute with extra depth or breadth courses from above lists)*

Biol 204	Animal Development (w/ lab)	Psyc 216	Perception
Biol 207	Animal Behavior (w/ lab, F11 course)	Psyc 220	Psychology of Health
Biol 303 or 304	Genetics (304 is w/ lab)	Psyc 224	Psychological Disorders
Biol 307	Cell Biology	Psyc 231	Psychology of Aging
Biol 325	Molecular Biology (w/ lab)	Psyc 306	Psycholinguistics
Biol 340	Animal Physiology (w/ lab)	Psyc 327	Cognitive Processes
Chem 414	Biochemistry	Xxxx 451/452	Independent Research (4 credits of research in another department/program as approved by the Neuroscience committee)
Chem 416	Mechanisms of Drug Action		
Comp 141/142	Computer Science I or II		
Phil 328	Philosophy of Mind and Consciousness		

Recommended courses not part of the major

Chem 211-212	Organic Chemistry I and II (w/ lab)	Math 330	Biostatistics
Math 115	Applied Calculus	Phys 111-112	Physics I and II (w/ lab)
Math 212	Applied Regression		



For more information contact members of the Program Committee or visit http://www.rhodes.edu/neuro