

BEHAVIORAL BIOLOGY PROGRAM

<http://krieger.jhu.edu/behavioralbiology> (<http://krieger.jhu.edu/behavioralbiology/>)

The David S. Olton Behavioral Biology Program seeks to establish a greater understanding of the relations of brain and behavior through an interdisciplinary program of study. Students in the Behavioral Biology Program examine the complex interplay between environment and behavior, and the processes and mechanisms that underlie behavior. One goal of the program is for students to learn how to integrate scientific discoveries from the wide array of scientific fields of inquiry that contribute to the study of behavioral biology, from molecular biology to sociology.

The interdisciplinary characteristics of the Behavioral Biology Program provide an excellent preparation for post-graduate work. For those interested in the health professions, behavioral biology can be integrated into a premedical curriculum that will provide a broad, humanistic perspective. For those who wish to pursue scientific careers in psychopharmacology, behavioral neuroscience, and physiological psychology, the program provides excellent preparation. Students interested in the fields of organismal or integrative biology should also consider this major.

Many students ask about the similarities and differences between the behavioral biology major and the neuroscience major. Both of these programs are interdepartmental, and a majority of professors teach courses that are listed for both majors. Behavioral Biology majors can explore many aspects of the biology of behavior, including the neural mechanisms of behavior (which obviously overlaps with the neuroscience major), but also biomechanical, evolutionary, ecological, and social aspects of behavior. The behavioral biology major also has fairly liberal course requirements which provide students with an opportunity to explore more choices in their liberal arts education. Students majoring in neuroscience focus directly on the brain and on neural function/mechanisms. Generally speaking, the systems neuroscience focus area in the neuroscience major has the most overlap with behavioral biology.

Programs

- Behavioral Biology, Bachelor of Arts (<https://e-catalogue.jhu.edu/arts-sciences/full-time-residential-programs/degree-programs/behavioral-biology/behavioral-biology-bachelor-arts/>)

For current course information and registration go to <https://sis.jhu.edu/classes/>

Courses

AS.290.101. Human Origins. 3 Credits.

This course examines the origins of human structure, function and behavior from an evolutionary perspective. It includes study of the evolution, behavior and behavioral ecology of nonhuman primates, hominid evolution (including the paleontological and archaeological records), and the origins of human cognition, social behavior and culture. Area: Natural Sciences, Social and Behavioral Sciences

AS.290.303. Animal Behavior and Communication Lab. 3 Credits.

This course examines animal behavior and more specifically animal communication in all modalities (especially sound, sight, and scent). Students will learn how to design experiments, analyze results and write scientific papers in publication form. Students will work on one class experiment for their first paper and then design and conduct their own experiment for their second paper. The course is held in a computer laboratory and on some occasions at "field" locations on or adjacent to campus.

Prerequisite(s): AS.200.208 OR AS.200.344

Area: Natural Sciences, Social and Behavioral Sciences

AS.290.304. Comparative Neuroanatomy. 3 Credits.

This course examines the phylogenetic and developmental history of the central nervous system across the vertebrate tree of life, with emphasis on the deep history of those features that characterize the human brain. We will study how our understanding of non-human vertebrates (both model and non-model organisms) can provide important insights into the structure and function of the modern human brain.

Prerequisite(s): AS.080.306 OR AS.200.141

Area: Natural Sciences

AS.290.306. Behavioral Evolution Lab. 3 Credits.

This computer lab-based class will provide an opportunity for hands-on learning of modern phylogenetic methods for studying behavioral evolution. Students will become familiar with current systematic theory, how to formulate hypotheses using evolutionary trees, and the techniques used to test these hypotheses. Much of the class will be devoted to analyzing their own behavioral dataset and culminate in a final presentation of their findings.

Area: Natural Sciences, Social and Behavioral Sciences

Writing Intensive

AS.290.330. Human Sexuality. 3 Credits.

Course focuses on sexual development, sexuality across the lifespan, gender identity, sexual attraction and arousal, sexually transmitted disease, and the history of commercial sex workers and pornography. Please note that the use of electronic devices is not permitted during this class, in order to promote the full interactive potential of this engaging seminar-style offering. Open to Juniors & Seniors within the following majors/minors: Behavioral Biology; Biology; Cognitive Science; Medicine, Science & the Humanities; Molecular & Cellular Bio; Neuroscience; Psychological & Brain Sciences; Public Health; Sociology; Study of Women, Gender, & Sexuality. Students may receive credit for either AS.290.330 or AS.290.420, but not both.

Prerequisite(s): Students may receive credit for AS.200.204 or AS.290.330 or AS.290.420, but only ONE can count towards the upper level SOCSCI in Behavioral Biology.

Area: Social and Behavioral Sciences

AS.290.400. Comparative Neural Systems and Behavior Research Discussions. 0.5 Credits.

This course is required concurrently with research in the Comparative Neural Systems Research and Behavior lab. During the scheduled meetings we will discuss scientific papers, policies and procedures, research ethics and other information related to activities in the lab. At the end of the semester, students will present their research in groups. This course is only open to students doing research in the Neural Systems and Behavior Lab.

AS.290.420. Human Sexual Orientation. 3 Credits.

This course will examine the historical and current theories of sexual orientation and sexual variation development by examining the biological, psychological and social contributing factors that influence the development of sexual orientations and variations along with treatment and modification of problematic sexual behaviors. Priority given to Behavioral Biology majors.

Prerequisite(s): Students may receive credit for AS.200.204 or AS.290.330 or AS.290.420, but only ONE can count towards the upper level SOCSCI in Behavioral Biology

Area: Social and Behavioral Sciences

AS.290.490. Senior Seminar: Behavioral Biology. 1 Credit.

This course will examine the historical and current theories of sexual orientation and sexual variation development by examining the biological, psychological and social contributing factors that influence the development of sexual orientations and variations along with treatment and modification of problematic sexual behaviors. Priority given to Behavioral Biology majors.

Prerequisite(s): AS.290.101 AND AS.200.208 AND AS.200.208 AND AS.200.208, or Instructor permission.;AS.200.141 AND AS.200.208 AND AS.290.101 or instructor permission.:(AS.290.101 AND AS.200.208 AND AS.200.141) or Instructor permission.:(AS.200.141 AND AS.200.208 AND AS.290.101) OR Instructor Permission.

Area: Social and Behavioral Sciences

AS.290.500. Connections in Behavioral Biology. 0.5 Credits.

In this seminar, students discuss the intellectual merit of current or potential future research, internship and outreach activities in Behavioral Biology. This course is designed to 1) expose Behavioral Biology majors to new knowledge in the field, 2) provide the opportunity to develop oral and written communication skills, and 3) build community among students in the major. Students will make oral presentations and write a short paper/news piece or prepare a webpage.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.501. Behavioral Biology Research - Freshmen. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.502. Research-Freshmen. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.503. Behavioral Biology Research-Behavioral Biology Majors. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.504. Behavioral Biology Research-Behavioral Biology Majors. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.505. Behavioral Biology DUS Approved Research. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with a faculty member that does not have a Behavioral Biology research section. Pre-approval by the DUS of Behavioral Biology is required. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor and submitted to the DUS. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.519. Independent Study. 1 - 3 Credits.

An independent study is when you pursue a topic of special interest within Behavioral Biology. You must initiate the process. The independent study project must be pre-approved by the DUS of Behavioral Biology and must culminate in a substantial research or topic paper submitted to the DUS. For more information visit <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.520. Independent Study. 1 - 3 Credits.

An independent study is when you pursue a topic of special interest within Behavioral Biology. You must initiate the process. The independent study project must be pre-approved by the DUS of Behavioral Biology and must culminate in a substantial research or topic paper submitted to the DUS. For more information visit <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.590. Behavioral Biology Internship. 1 Credit.

Students who have found a Behavioral Biology related unpaid internship can enroll in this section for up to 1 credit with the DUS of Behavioral Biology pre-approval. Students are required to submit a paper summarizing their internship experience that is approved by their internship mentor and submitted to the DUS. For more information visit <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.594. Behavioral Biology Internship. 1 Credit.

Students who have found a Behavioral Biology related unpaid internship can enroll in this section for up to 1 credit with the DUS of Behavioral Biology pre-approval. Students are required to submit a paper summarizing their internship experience that is approved by their internship mentor and submitted to the DUS. For more information visit <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.595. Behavioral Biology Research - Freshmen. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.596. Behavioral Biology Internship. 1 Credit.

Students who have found a Behavioral Biology related unpaid internship can enroll in this section for up to 1 credit with the DUS of Behavioral Biology pre-approval. Students are required to submit a paper summarizing their internship experience that is approved by their internship mentor and submitted to the DUS. For more information visit <https://krieger.jhu.edu/behavioralbiology/research/>.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

AS.290.597. Behavioral Biology Research-Behavioral Biology Majors. 1 - 3 Credits.

Students will receive a hands-on experience conducting Behavioral Biology Research with the faculty member listed on this section who must approve your enrollment. In addition to participating in laboratory research students are required to submit a research style paper summarizing their work that is approved by their mentor. Information on the paper, research credits and how to enroll can be found at <https://krieger.jhu.edu/behavioralbiology/research/>. Students working in Dr. Moss's lab must also register for AS.290.400 Comparative Neural Systems and Behavior Research Discussions.

Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration, Online Forms.

Cross Listed Courses**Biology****AS.020.153. General Biology Laboratory I. 1 Credit.**

This course reinforces the topics covered in AS.020.151. Students participate in a semester-long project, identifying bacteria from Homewood campus soils using molecular biology techniques. Other laboratory exercises cover aspects of evolution, genomics and biochemistry. Cross-listed with Behavioral Biology. Student must have enrolled in AS.020.151 either this term or in past terms. Students who have credit for AP Biology but take General Biology Lab I will lose four credits of AP Biology credit. Cross-listed with Behavioral Biology. **Prerequisite(s):** Students must have completed Lab Safety training prior to registering for this class. To access the tutorial, login to myLearning and enter 458083 in the Search box to locate the appropriate module.;AS.020.151 can be taken prior to or at the same time as AS.020.153.

Area: Natural Sciences

First Year Seminars**AS.001.165. FYS: Biology in Deep Time. 3 Credits.**

This First-Year Seminar will explore seminal ideas in macroevolutionary theory through both classic and cutting-edge studies. Topics would include the relationship between evolution and development, how fossils shape our understanding of biological systems, and the logical basis of evolutionary inference. Students will also gain an appreciation for the historical development of these ideas and their application in modern science and beyond.

Area: Natural Sciences, Social and Behavioral Sciences

Neuroscience

AS.080.301. Behavioral Assessment of Animal Models of Cognition and Neuropsychiatric Disorders. 3 Credits.

What does a rat exploring its environment tell us about memory? How can a mouse help us better understand schizophrenia? This course will focus on procedures that are routinely used to study behavior in animal models of cognition and neuropsychiatric disorders. Topics will include motor function, emotional and motivational states, disorders such as dementia and schizophrenia, among others. Throughout the course, we will read and discuss original research articles to illustrate and compare some of the measures and results from the various procedures.

Prerequisite(s): AS.200.141 OR AS.050.105 OR AS.080.306 OR instructor permission.

Area: Social and Behavioral Sciences

AS.080.304. Neuroscience Learning and Memory. 3 Credits.

This course is an advanced survey of the scientific study of learning and memory. Different perspectives will be used to review the science of learning and memory including the cellular-molecular basis of synaptic plasticity, the functional circuitry involved in learning and memory and memory systems in the brain. The course is designed to provide a deep understanding of the issues and current debates in learning and memory research and focuses specifically on animal models of memory and memory impairment. This is an interactive lecture course with a strong emphasis on student participation.

Prerequisite(s): AS.200.141 OR AS.080.306 OR (AS.020.312 AND AS.020.306) or instructor permission.

Area: Natural Sciences

AS.080.308. Neuroeconomics. 3 Credits.

Every day decisions often require us to weigh the costs and benefits of engaging in a particular course of action in order to obtain some expected outcome. Unfortunately, we often lack the information necessary to obtain our desired goal with complete certainty. Economists have long been interested in understanding human decision-making under these circumstances. In parallel, neuroscientists have made great strides at describing the underlying neural basis of simple decision-making. However, despite much progress in both fields, our understanding of how the brain makes decisions is incomplete. In order to strengthen and further research in both fields, the interdisciplinary field of Neuroeconomics arose. This course will survey the field of Neuroeconomics focusing on theoretical concepts developed by economists and the role these theories are playing in guiding current experimental neuroscience.

Prerequisite(s): AS.080.306 OR AS.200.141 OR AS.020.312

Area: Natural Sciences

AS.080.328. Behavioral Neuroscience Lab. 3 Credits.

Class designed to give students first-hand knowledge of the behavioral procedures and techniques used to study behavior in the field of neuroscience. Students will gain hands-on experience by carrying out some of the behavioral tasks used to assess animals under specific behavioral domains, discuss why certain aspects (i.e. genotype, environment conditions, group size, etc.) are important factors to consider when designing, planning, and carrying out such experiments, and learn the relevance of behavioral research in translational medicine.

Prerequisite(s): AS.200.141 OR AS.200.302 OR AS.080.301 OR AS.080.306 or permission by instructor.

Area: Natural Sciences

Psychological & Brain Sciences

AS.200.141. Foundations of Brain, Behavior and Cognition. 3 Credits.

A survey of neuropsychology relating the organization of behavior to the integrative action of the nervous system. Cross-listed with Behavioral Biology and Neuroscience.

Area: Natural Sciences, Social and Behavioral Sciences

AS.200.208. Animal Behavior. 3 Credits.

This course examines how and why animal behaviors are produced across the animal kingdom. Neurobiological, hormonal and developmental mechanisms and adaptive function of behaviors are examined in an evolutionary context. Behaviors include survival, acquiring food, reproduction, communication, parental care, and cooperation. Students will also learn how to develop hypotheses and predictions for scientific questions and interpret graphical results.

Prerequisite(s): AS.200.141 OR Permission of Instructor.

Area: Natural Sciences, Social and Behavioral Sciences

AS.200.334. Human Memory Psychology. 3 Credits.

This class will survey the behavioral and biological science of human memory. Historical perspectives as well as modern controversies will be discussed. Intersections with other fields such as law, education, medicine, and technology will be highlighted. The course will be a mixture of lectures and group discussions.

Area: Social and Behavioral Sciences

AS.200.344. Behavioral Endocrinology. 3 Credits.

This course examines both the evolution and mechanisms of hormonal effects on behavior across animals, including humans. Topics will include the effects of hormones on sexual differentiation, reproductive behavior, parental behavior, stress and social behavior. Additionally, this course emphasizes developing skills in hypothesis testing and critically assessing the scientific literature. Cross-listed with Behavioral Biology and Neuroscience.

Prerequisite(s): (AS.200.141 OR AS.080.306) OR (AS.020.152) or instructor's permission

Area: Natural Sciences, Social and Behavioral Sciences

For current faculty and contact information go to http://krieger.jhu.edu/behavioralbiology/faculty_directory/