NEUROSCIENCE TRAINING PROGRAM (NTP)

NTP/NEURODPT 610 — CELLULAR AND MOLECULAR NEUROSCIENCE
4 credits.

Study of original papers leading to an understanding of the molecular basis of electrical activity in neurons. Topics include voltage-sensitive currents, molecular biology of neuronal receptors, synaptic transmission and sensory transduction. Lectures supplemented with experimental demonstrations and discussion sessions. Enroll Info: Zoo 523 or equiv
Requisites: Graduate/professional standing or (BOTANY/BIOLOGY/ZOOLOGY 151 or BIOLOGY/ZOOLOGY 101 or BIOCORE 485) and (CHEM 103, 104, or 109) and (PHYSICS 202, 208, or 248)
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2019

NTP/NEURODPT/PSYCH 611 — SYSTEMS NEUROSCIENCE
4 credits.

Introduction to the anatomy and physiology of the mammalian nervous system. Lectures will cover the neuroanatomy of the major subdivisions of the human brain, the major sensory and motor systems, and higher order functions. Lab/discussion sections will emphasize readings from the primary literature and hands-on dissections. Enroll Info: None
Requisites: NEURODEPT 610 or graduate/professional standing
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2020

NTP/NEURODPT/ZOOLOGY 616 — LAB COURSE IN NEUROBIOLOGY AND BEHAVIOR
4 credits.

Students will do three independent experimental modules exploring neurophysiology and behavior, each taking 4-5 weeks. Students will work in groups of 2 or 3 and will learn techniques and then develop their own short investigations into each of three separate areas of neurobiology. There will be continual interaction between students and faculty. Enroll Info: PSYCH/ZOOLOGY 523 and PHYSIO /ZOOLOGY 524 or PHMCOL-M/PHYSIOL 610 and PHMCOL-M/PSYCH/NEURODPT/NTP 611
Requisites: None
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

NTP/ANTHRO/PSYCH/ZOOLOGY 619 — BIOLOGY OF MIND
3 credits.

Origins and structures of mind, brain, and consciousness. Transitions from early mammalian through primate to hominid intelligence. Genetics and plasticity in brain development. Modern studies of human brain mechanisms and consciousness. Enroll Info: Jr st; college level elem crse in biology or psych
Requisites: Junior standing; not open to special students
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2018

NTP/ZOOLOGY 620 — NEUROETHOLOGY SEMINAR
2 credits.

A group discussion of primary literature articles relevant to the neural basis of behavior with a purpose to understand the neural basis of behavior in animals, to learn to read papers critically and improve discussion leading skills. Enroll Info: Introductory biology. Background in neuroscience strongly recommended
Requisites: None
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2020

NTP/NEURODPT 629 — MOLECULAR AND CELLULAR MECHANISMS OF MEMORY
3 credits.

Focuses on the cell signaling and the resulting structural changes that occur at neuronal synapses during memory formation. The aim is to understand how the synaptic changes underlying memory occur. Enroll Info: None
Requisites: Graduate/professional standing or ANAT&PHY 335, 435, PHYSIOL 335, 435 or ZOOLOGY/PSYCH 523
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2019
### NTP/NEURODPT 630 — NEURONAL MECHANISMS FOR SENSATION AND MEMORY IN CEREBRAL CORTEX

3 credits.

Current literature will be considered in lectures and discussions that provides insight into how the cerebral cortex processes sensory information to generate and store cogent representations of the external world. The course includes laboratory exercises and demonstrations. **Enroll Info:** None  
**Requisites:** PHMCOL-M/PSYCH/NEURODPT/NTP 611, MED SC-M 731, COMP BIO 505, ZOOLOGY/PSYCH 523, PSYCH 454, or graduate/professional standing  
**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req  
**Level:** Advanced  
**L&S Credit:** Counts as Liberal Arts and Science credit in L&S  
**Grad 50% - Counts toward 50% graduate coursework requirement**  
**Repeatable for Credit:** No  
**Last Taught:** Spring 2017

### NTP/MED PHYS 651 — METHODS FOR NEUROIMAGING RESEARCH

3 credits.

Provides a practical foundation for neuroimaging research studies with statistical image analysis. Specific imaging methods include functional BOLD MRI, structural MRI morphometry, and diffusion tensor imaging. Lectures and associated in-class computer exercises will cover the physics and methods of image acquisition, steps and tools for image analyses, the basis for statistical image analyses and interpretation of the results. **Enroll Info:** None  
**Requisites:** Graduate/professional standing or (PHYSICS 104, 202 or 208)  
**Course Designation:** Level - Advanced  
**L&S Credit:** Counts as Liberal Arts and Science credit in L&S  
**Grad 50% - Counts toward 50% graduate coursework requirement**  
**Repeatable for Credit:** No  
**Last Taught:** Fall 2019

### NTP 660 — NEUROSCIENCE & PUBLIC POLICY SEMINAR

1-2 credits.

A graduate level seminar open to advanced undergraduates with consent of instructor. Covers various topics in neuroscience and in the related sciences in lectures that demonstrate the interaction between science and public policy. **Enroll Info:** Undergraduates: a background in neuroscience, (ZOOLOGY/PSYCH 523 and 524, or Biocore 323 or Neurosci 610 and 611). Grad st in the Neuroscience Training Program or in the Neuroscience and Public Policy Program  
**Requisites:** None  
**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement  
**Repeatable for Credit:** Yes, unlimited number of completions  
**Last Taught:** Spring 2020

### NTP 670 — STEM CELLS AND THE CENTRAL NERVOUS SYSTEM

2-3 credits.

Among the topics that will be included in the course are: embryonic stem cells, adult stem cells, and the transplantation of embryonic and adult stem cell to the developing and adult CNS for experimental and therapeutic purposes. **Enroll Info:** BIOCHEM 501 or equiv. Grad stdts in the sciences or adv undergrads with cons inst  
**Requisites:** None  
**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req  
**Level:** Advanced  
**L&S Credit:** Counts as Liberal Arts and Science credit in L&S  
**Grad 50% - Counts toward 50% graduate coursework requirement**  
**Repeatable for Credit:** No  
**Last Taught:** Fall 2019

### NTP 675 — SPECIAL TOPICS

1-3 credits.

**Enroll Info:** Variable  
**Requisites:** None  
**Course Designation:** Level - Advanced  
**L&S Credit:** Counts as Liberal Arts and Science credit in L&S  
**Grad 50% - Counts toward 50% graduate coursework requirement**  
**Repeatable for Credit:** Yes, unlimited number of completions  
**Last Taught:** Summer 2019

### NTP 677 — BASIC SLEEP MECHANISMS AND SLEEP DISORDERS: FROM NEUROBIOLOGY TO SLEEP MEDICINE

3 credits.

Sleep occupies a third of our life, is found in all animal species carefully studied so far, and loss of sleep has both acute and long-term negative consequences on the brain and the body. Still, why we sleep remains unclear, and hypotheses on the role of sleep for synaptic homeostasis, learning and memory are being tested. Lectures will focus on the neurobiology of sleep, with detailed review of the brain structures involved in controlling wake and sleep, as well as the circadian and homeostatic regulation of sleep. Other topics will include changes in sleep need with age, animal models to study sleep, sleep disorders, and genetics of sleep. **Enroll Info:** None  
**Requisites:** PSYCH 454 and ZOOLOGY/PSYCH 523; or graduate/professional standing  
**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement  
**Repeatable for Credit:** No  
**Last Taught:** Fall 2019

### NTP 700 — PROFESSIONAL DEVELOPMENT FOR BIOMEDICAL GRADUATE STUDENTS

1 credit.

Provides graduate students with the skills and knowledge necessary to succeed in science. Topics which are covered include choosing a thesis advisor, grant writing, preparing a seminar presentation, etc. **Enroll Info:** None  
**Requisites:** Graduate/professional standing  
**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement  
**Repeatable for Credit:** No  
**Last Taught:** Fall 2019
NTP 701 — EXPERIMENTAL DESIGN AND STATISTICAL METHODOLOGY
1 credit.

Application of the scientific method and experimental design, with a focus on experimental neuroscience. Topics include best practices that underlie robust and unbiased experimental approaches, methods, analyses, data interpretation and transparent reporting of results. Enroll Info: None
Requisites: Graduate/professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Summer 2019

NTP/NEUROL 735 — NEUROBIOLOGY OF DISEASE
2 credits.

Seminar course relating major categories of human neurological and ophthalmological disease to fundamental topics in neurobiology. Enroll Info: None
Requisites: Graduate/professional standing and PHMCOL-M/PHYSIOL 610
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2020

NTP/NEURODPT/ZOOLOGY 765 — DEVELOPMENTAL NEUROSCIENCE
3 credits.

Analysis of neural development with emphasis on experimental approaches. Combination of lectures and discussions of primary literature. Topics include neural induction, patterning, mechanisms of axon guidance, neural crest cell migration and differentiation, cortical development, and synapse formation and elimination. Enroll Info: None
Requisites: Graduate/professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2020

NTP 900 — NEUROSCIENCE SEMINAR: CURRENT TOPICS IN NEUROBIOLOGY
1 credit.

Critical review of selected topics in neurobiology. Enroll Info: Cons inst
Requisites: Declared in Neuroscience program
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2020

NTP 990 — RESEARCH AND THESIS
1-12 credits.

Enroll Info: Grad st in Neurosci
Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2020

NTP 999 — ADVANCED INDEPENDENT STUDY
1-3 credits.

Enroll Info: None
Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions