GRADUATE STUDIES IN

BEHAVIORAL NEUROSCIENCE

The Program

The Behavioral Neuroscience Division of the Department of Psychological Sciences offers two Ph.D. programs that specialize in Behavioral Neuroscience and Neuroscience. Although these programs differ somewhat in content and emphasis, both provide an opportunity for the student to specialize in the topics of his or her greatest interest within the field, while acquiring a background of strong preparation in related fields.

The programs offer a wide variety of techniques and approaches to studying the relationship between the nervous system and behavior. A special emphasis of these programs is on electrophysiological and neurochemical analyses of sensory, motor, motivational, and cognitive processes organized within the mammalian telencephalic forebrain (e.g. neocortex, entorhinal cortex, hippocampus, thalamus and basal ganglia). Interaction among students and faculty from different laboratories is strongly encouraged, and students acquire a broad perspective on behavioral neuroscience. Research opportunities are further augmented by both local and international collaborations between the faculty and colleagues at other research institutions.

Facilities

The Behavioral Neuroscience research facility encompasses an entire floor of the newly renovated Psychology Building. The modern research facilities are situated in close proximity, which allows interactions between laboratories, faculty, and students. Facilities include state-of-the-art anatomical, electrophysiological, optical imaging, neurochemical, virtual reality testing systems, human physiology testing, behavioral equipment, and an AAALAC accredited animal housing facility.

Admission

Admission criteria include transcripts, GRE scores (General GRE is required, Psychology Subject Test is optional), or MCAT, previous research experience, three letters of recommendation, and compatibility of research interests of the applicant with those of the core faculty. Students are strongly encouraged to directly contact (email) members of the faculty with whom they may be interested in working.

Completed applications should designate Psychological Sciences as the Field of Study and either Behavioral Neuroscience or Neurosciences as the Area of Concentration. Applicants who are willing to be considered for both areas should indicate that fact on their application, as well as their preference.
Financial Aid

Financial support includes teaching assistantships, research assistantships, and fellowships. All assistantships include a stipend, full tuition waiver and medical/dental health benefits.

Location

The Behavioral Neuroscience division, which is part of the highly ranked Psychological Sciences department, is located at the main campus of the University of Connecticut, at Storrs. The University of Connecticut is a Research I university, with an enrollment of about 28,000 including 6,000 graduate students, served by 1,600 faculty. Storrs is a small community located in a scenic, rural, hilly area of northeastern Connecticut. Several major urban areas are within easy driving distance: Hartford, 35 min.; New Haven, Boston, and Providence 1 - 1.5 hrs; and New York City, 3 hrs, as well as major skiing areas and the waters of Long Island Sound, 45 min.

A great number of cultural and recreational opportunities are available at the university itself. Concert and theatrical series bring to campus internationally renowned groups encompassing a wide variety of performances, in addition to the University’s own musical and dramatic productions. Specialized art galleries, the William Benton Museum of Art and the University Museum of Natural History present frequently changing exhibitions of traveling shows and their own collections all situated on campus.

For further information and application forms please contact:

Behavioral Neuroscience Graduate Program
406 Babbidge Rd., Unit 1020
Storrs, CT 06269 – 1020

Tel. (860) 486 - 2057
Fax (860) 486 - 2760

or go to: [http://psych.uconn.edu/behavioral-neuroscience-division/](http://psych.uconn.edu/behavioral-neuroscience-division/)
Core Faculty

Robert S. Astur (203) 236-9938; robert.astur@uconn.edu
Website: http://asturlab.uconn.edu/
Neural basis of learning and memory in humans; hippocampal function assessment using virtual reality; gender differences; spatial memory skill / hormones; chemical and behavioral addictions; eating disorders; posttraumatic stress disorder factors; psychological resiliency techniques

James J. Chrobak (860) 486-4243; james.chrobak@uconn.edu
Emergent physiological (i.e., fast-frequency oscillations) and cognitive properties (memory consolidation) of the hippocampal formation and interconnected circuits; relation to neuropathology of temporal lobe dysfunction (e.g., dementia, temporal lobe epilepsy).

R. Holly Fitch (860) 486-2554; roslyn.h.fitch@uconn.edu
Website: https://fitchlab.uconn.edu/
Animal models of early brain damage and genetic mutations associated with developmental disability. Research incorporates a wide range of behavioral assessments, with emphasis on deficits in auditory processing as a model for language disability. We also consider variables such as sex, experience, therapeutic intervention, and neuroanatomic outcomes.

Etan J. Markus (860) 486-4588; etan.markus@uconn.edu
Website: http://markus.lab.uconn.edu/
Brain basis of learning, memory and navigation; age-related changes in learning; spatial and context learning; using immediate early genes to examine which populations of cells encode an experience; recording from networks of individual hippocampal neurons as rats learn and perform different tasks.

Heather L. Read (860) 486-4108; heather.read@uconn.edu
BNS Website: http://read.lab.uconn.edu/
Engineering Collaborative Website: http://escabilab.uconn.edu/
We use animal models, behavioral training, high-resolution electrophysiology and optical imaging techniques to measure the neurobiological bases for discriminating tone, shape and rhythm in natural sounds including social communication sequences. The biomedical applications include developing diagnostic tools and interventions for natural sound processing and communication deficits. Seeking qualified graduate students for Interdisciplinary Neuroscience Core projects on Brain Computer Interface (BCI).

John D. Salamone (860) 486-4302; john.salamone@uconn.edu
Website: http://salamone.lab.uconn.edu
Motivational and motor functions of dopamine, adenosine and acetylcholine, neural/behavioral pharmacology, microdialysis methods for studying neurotransmission, neurotransmitter interactions and signal transduction, animal models of Parkinsonism, depression, schizophrenia and binge eating, neuroinflammation and motivation.

Ian H. Stevenson (860) 486-6822; ian.stevenson@uconn.edu
Website: http://stevenson.lab.uconn.edu
Computational neuroscience; statistical analysis of neural data; neural coding, dynamics, and interactions; plasticity and adaptation.
Harvey A. Swadlow (860) 486-2252; harvey.swadlow@uconn.edu
Processing of sensory information by thalamocortical and intracortical networks; modulation of this processing with different states of alertness and attention.

Maxim Volgushev (860) 486-6825; maxim.volgushev@uconn.edu
Website http://www.volgushev.uconn.edu/
Neurophysiology of the visual system; signal processing in visual cortical neurons in vivo; fast and slow oscillations of brain activity; action potential generation and cellular electrophysiology; synaptic transmission and plasticity.

**Affiliated Faculty**

Jose-Manuel Alonso
Professor of Biological Sciences, State University of New York (SUNY-Optometry)
(212) 938-5573, jalonso@sunyopt.edu

Chi-Ming A. Chen
Department of Psychology (Clinical Subdivision), University of Connecticut
(860) 486-3521, chi-ming.chen@uconn.edu

Merce Correa
Department of Psychology, Area of Psychobiology, University of Jaume I, Castello, Spain
(34) 964-729841, correa@psb.uji.es

Monty Escabi
Department of Biomedical Engineering, University of Connecticut
(860) 486-3518, escabi@engr.uconn.edu; http://www.engr.uconn.edu/~escabi/index.html

Deborah Fein
Department of Psychology (Clinical Subdivision), University of Connecticut
(860) 486-3518, deborah.fein@uconn.edu

PSYC 5150. Neurodevelopment and Plasticity (Fitch). Also offered as COGS 5130. Offered bi-annually in Spring semester. Overview of brain development including: embryonic neurogenetics; evolution and evo-devo; how emergent behavioral capabilities reflect neural growth in neurobehavioral development; and how disruptions of neurodevelopment cause developmental disabilities.


PSYC 5270. Current Topics in Behavioral Neuroscience. Each semester. One-six credits. One class period. Special topics (grant writing) or areas of research (neuroanatomy) with particular attention to recent developments in the field.

PSYC 5270. Synaptic Transmission and Plasticity. (Volgushev). Three credits. The class covers a broad range of topics in the area of cell electrophysiology, synaptic transmission, plasticity of synaptic transmission, synaptic plasticity during development and in learning and memory. The main focus is on operation of neurons in the cerebral cortex.


PSYC 5228. Neuropsychopharmacology (Salamone). Second semester. Three credits. Three class periods. This course will review the anatomy and physiology of the CNS and then discuss the effects of pharmacological agents on it. Topics include general anesthetics, hypnotics and sedatives, anticonvulsants, alcohol, muscle relaxants, tranquilizers, hallucinogens, and narcotics. Student presentations will treat topics relating the CNS and behavioral pharmacology.

PSYC 5251. Neural Foundations of Learning and Memory (Markus). Second semester. Three credits. Three class periods. Offered in alternate years. Examination of the processes involved in habituation, conditioning, learning, and memory through a study of the neural elements and systems involved in their production and maintenance.

PSYC 5257. Physiological Psychology Laboratory Semester by arrangement. Three credits. One class period. Techniques in behavioral neuroscience, neurophysiology, neuroanatomy and neurochemistry.

PSYC 5801. Neurophysiology (Swadlow). Semester by arrangement. Three credits.

*Unless otherwise noted, course registration requires consent of instructor.
Related Courses

PSYC 5553. Introduction to Non-linear Dynamics
PNB 5301. Fundamental of Neurobiology
PNB 5314. Physiology of Excitable Cells
PNB 5330. Hormones and Behavior
PNB 6417. Developmental Neurobiology
PNB 6418. Integrative Neurobiology
PNB 6426. Molecular and Cellular Neurobiology
PHAR 5219. Biopharmaceutics and Pharmacokinetics
PHAR 6289. Pharmacokinetics
PHAR 6473. Function and Dysfunction of Brain Synapses
Representative Publications of BNS Faculty

Astur


Chrobak


Fitch


Truong, DT, Che, A, Rendall, AR, Szalkowski, CE, LoTurco, JJ, Galaburda, A. & Fitch, RH. 2014. Mutation of Dcc2 in mice leads to impairments in auditory processing and memory ability. Genes, Brain and Behavior, 13 (8), 802 - 811.


Markus


Read


Salamone


Stevenson


**Swadlow**


Reviews:


Selected original papers (more at http://www.volgushev.uconn.edu/a_publications.html):


Lee CM, Stoelzel C, Chistiakova M, Volgushev M. Heterosynaptic plasticity induced by intracellular tetanisation in layer 2/3 pyramidal neurons in rat auditory cortex. – J Physiology 2012, 590.10: 2253-2271


Chauvette S, Volgushev M, Timofeev I. Origin of active states in local neocortical networks during slow wave sleep - Cerebral Cortex 2010, 20: 2660-2674


Volgushev M, Xing Pei, Vidyasagar TR, Creutzfeldt OD - Excitation and inhibition in orientation selectivity of cat visual cortex neurons revealed by whole-cell recordings in vivo - Visual Neuroscience 1993, 10:1151-1155

Shevelev IA, Volgushev MA, Sharaev GA - Dynamics of responses of V1 neurons evoked by stimulation of different zones of receptive field - Neuroscience 1992 51:445-450