Areas of Emphasis

There are 20 faculty involved in the program. Their work covers a wide range of fields in Neurobiology, including molecular, cellular, and behavioral biology. The broad areas of research emphases at UTSA are:

- CNS Patterning and Cell Fate
- Cognitive Processing in Bilinguals
- Physiology and Biochemistry of Learning and Memory
- Age-related and Pathological Neurodegeneration
- Mechanisms of Reward and Addiction in Dopamine Neurons
- Mathematical Theory of Neurons and Nervous Systems
- Striatal and Hypothalamic Oscillators

UTSA Core Neurobiology Faculty

- DEBORAH L. ARMSTRONG
  Neurotoxicology
- ALFONSO APIELLA
  Cortical Microcircuit Physiology
- EDWIN BAREA-RODRIGUEZ
  Neurobiology of Aging
- BRIAN E. DERRICK
  Neurobiology of Learning & Memory
- GARY O. GAUFO
  Neural Patterning & Development
- MATTHEW J. GDOUN
  Neural control of Respiration
- DAVID B. JAFFE
  Hippocampal Physiology
- RICHARD G. LEBARON
  Extracellular Matrix
- ANNI LIN
  Epigenetic Control of Neurogenesis
- MARTHA J. LUNDELL
  CNS Cell Fate Specification
- CARLOS A. PALADINI
  Dopamine Physiology & Addiction
- GEORGE PERRY
  Cytopathology of Alzheimer’s Disease
- CLYDE F. PHELIX
  Neurobiology of Cardiovascular Disease
- ROBERT D. RENTHAL
  Sensory Receptor Biochemistry
- FIDEL SANTAMARIA
  Dendritic Structure & Computation
- DAVID M. SENSEMAN
  Cortical Network Activity
- KELLY J. SUTER
  Neurobiology of Reproduction
- TODD W. TROYER
  Neural Dynamics of Complex Behaviors
- NICOLE Y. Y. WICHA
  Neurobiology of Language & Cognition
- CHARLES J. WILSON
  Neurophysiology & Computation in the Basal Ganglia

Early CNS Patterning
Ventral hindbrain progenitor domains (red & green) that overlie the floor plate (blue) in embryonic neural tube (Gaufo lab).

Chaotic Desynchronization

Stimulating Neurons with Light
Green Fluorescent Protein expressing Dopamine neuron (green) with Td-tomato labeled channel-rhodopsin inputs (red) from a neighboring brain nucleus. Red inputs (arrows) can be selectively activated by targeted wavelengths of light to examine the effects of a single input onto a dopamine cell (Paladini lab).

Dynamic Control of Neural Activity
Dynamic clamp of balanced inhibitory and excitatory conductances applied to a dopaminergic neuron during whole-cell recording. A disinhibition burst is evoked by phasic removal of the inhibitory GABA_A conductance. A pause in firing is evoked by phasic removal of the excitatory NMDA conductance (Paladini lab).
About the Program
UTSA offers a PhD in Neurobiology with an interdisciplinary program for graduate training that is built on the principle that research science is best mastered in the laboratory. Our program prepares students for careers in academic and research science by emphasizing training in the experimental skills required to formulate and tackle problems in brain science. Our diverse and rigorous faculty research programs provide extensive opportunity for training and focus in research areas covering the entire range of interdisciplinary neuroscience, i.e., molecular, cellular, systems, behavioral, computational, and cognitive neuroscience.

Facilities
UTSA’s Doctoral program in Neurobiology offers an outstanding opportunity for graduate training in an exceptionally interactive and collaborative environment. Students receive training in state-of-the-art laboratories that are utilizing innovative technologies including human event related potentials, dynamic clamp electrophysiology, in vivo optogenetics, micro-computer tomography, inducible genetic mutants, and dynamical systems analysis of neurons. Available facilities include instrumentation and training analysis cores in proteomics, confocal imaging, and 2-photon excitation microscopy. The nearby Research Imaging Institute at the UT Health Sciences Center provides additional facilities for human cognitive studies including functional Magnetic Resonance Imaging (fMRI), Positron Emission Spectroscopy (PET) and Transcranial Magnetic Stimulation (TMS).

How to Apply
Applications for admission, inclusive of all supporting documentation, must be received by February 1 for acceptance to the Fall incoming class. Applications are accessed and submitted online at http://apply.embark.com/grad/utsa. A complete application should contain:

- The application form
- Official transcripts
- 3 letters of recommendation from persons of professional rank
- GRE scores
- TOEFL scores (if applicable)
- A recent resume
- A statement of research experience and interest

UTSA is an equal opportunity institution. Women, minorities and residents of South Texas are encouraged to apply.

For more information, contact:
Rene Munguia
Neurobiology PhD Program Administrator
(210) 458-4642
neurobiology@utsa.edu
http://bio.utsa.edu/phd_neur.html

For information about Neuroscience at UTSA, Visit the UTSA Neurosciences Institute online: http://neuroscience.utsa.edu

The Course of Study
Doctoral training begins with a series of three rotations in neuroscience laboratories concurrent with coursework in the first year. The core curriculum focuses on the fundamentals of Neurobiology, including courses in neuroanatomy, neurophysiology, neurochemistry and electives tailored to faculty expertise in diverse areas like computational neuroscience and human electrophysiology. Doctoral training is supplemented by a world-class seminar series, and numerous colloquia designed around special topics in neurobiology. In addition to the standardized curriculum, the UTSA Neurosciences Institute supplies a rich catalog of events including annual themed Symposia, a Distinguished Speaker series, grantsmanship bootcamp, and two annual workshops in experimental design and statistical analysis of image and numerical data.

Financial Support
UTSA Neurobiology PhD students receive financial support for the duration of their PhD, including tuition and a competitive stipend. Support is made possible through a combination of UTSA funds, federal grants to faculty members, and teaching assistantships. Eligible students should apply for training grants via NIH-funded Minority Biomedical Research Support Program, which supports stipend, tuition and fees, health insurance, and travel to scientific meetings.

Structure/Function

Image Capture and Analysis
Confocal images of pseudo color dendritic spine volumes (top, Santamaria lab). Placode-derived sensory ganglion (purple) and preganglionic axons (green) of the cranial autonomic nervous system (below, Gaufo Lab)

Students at the Bench
Immersion in laboratory research is the focus of the Neurobiology PhD at UTSA.