

### Early CNS Patterning

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

### Chaotic Desynchronization

A map of stimulus strength and frequency dependence of firing patterns during deep brain stimulation in a model neuron. Wilson et al. *Frontiers in Systems Neuroscience* (2011), reproduced with permission.



### 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<sub>A</sub> conductance. A pause in firing is evoked by phasic removal of the excitatory NMDA conductance (Paladini lab).

## UTSA Core Neurobiology Faculty

### DEBORAH L. ARMSTRONG

Neurotoxicology

### ALFONSO APICELLA

Cortical Microcircuit Physiology

### EDWIN BAREA-RODRIGUEZ

Neurobiology of Aging

### BRIAN E. DERRICK

Neurobiology of Learning & Memory

### GARY O. GAUFO

Neural Patterning & Development

### MATTHEW J. GDOVIN

Neural control of Respiration

### DAVID B. JAFFE

Hippocampal Physiology

### RICHARD G. LEBARON

Extracellular Matrix

### ANNIE 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

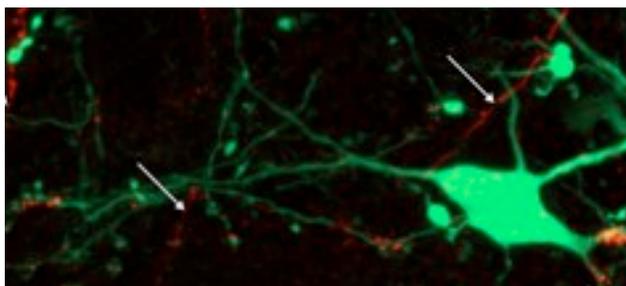
### CHARLES J. WILSON

Neurophysiology & Computation in the Basal Ganglia

## 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



### 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).



### Research Focus

State-of-the-art 2-photon excitation microscopy and image analysis facilities

# UTSA<sup>®</sup> Neuroscience

## Neurobiology PhD Program

[http://bio.utsa.edu/phd\\_neur.html](http://bio.utsa.edu/phd_neur.html)



The University of Texas at San Antonio

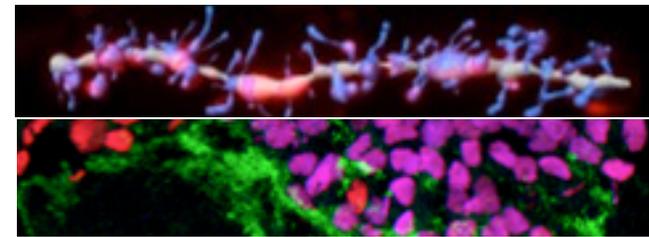
One UTSA Circle . San Antonio TX . 78249

## 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).



### 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)

## 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:

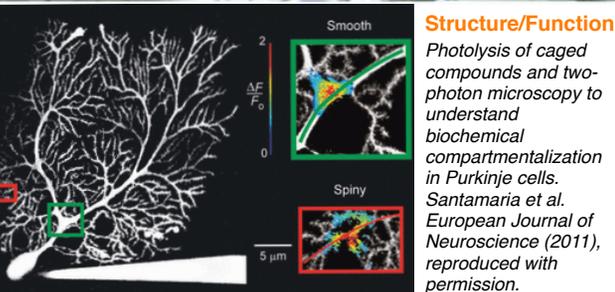
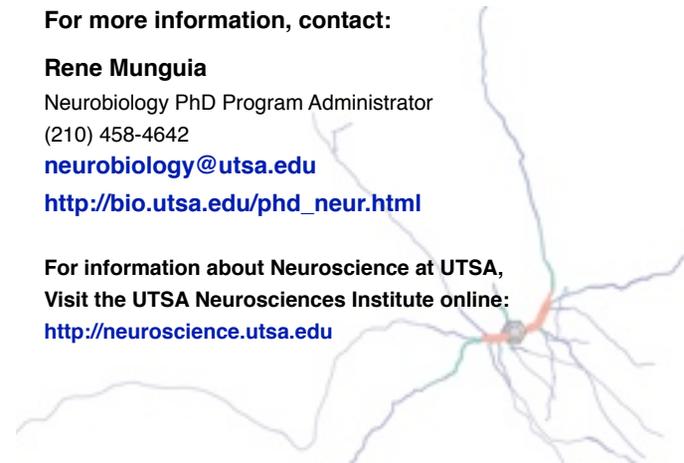
### Rene Munguia

Neurobiology PhD Program Administrator  
(210) 458-4642

[neurobiology@utsa.edu](mailto:neurobiology@utsa.edu)

[http://bio.utsa.edu/phd\\_neur.html](http://bio.utsa.edu/phd_neur.html)

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



### Structure/Function

Photolysis of caged compounds and two-photon microscopy to understand biochemical compartmentalization in Purkinje cells. Santamaria et al. *European Journal of Neuroscience* (2011), reproduced with permission.

### Students at the Bench

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



## 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.

## 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.