Administration. As of 2017 we are 24 faculty and 4 post-docs from 6 departments across 4 colleges. Gregory Granados is our Program Coordinator and fiscal expert; Salma Quraishi serves as Associate Director. The College of Sciences Research Service Center, which is under the direction of Santos (Mimi) Garza, is essential to our pre- and post-award federal grant management. Our Investigators and Administrators receive expert consultation and service on their grant operations from Nanette McKinney, Senior Research Award Coordinator.

Goals. As always, the Institute’s most vital and comprehensive goal is to promote excellence in our research-active neuroscience community. We aim to enhance and promote:

- **Research Environment** for Neuroscientists at UTSA by sponsoring thematic research enrichment (symposia, seminars) and by establishing and overseeing research core facilities.

- **Careers** of UTSA Neuroscientists in all Colleges and Departments by organizing peer mentoring, and other community-building activities.

- **Intellectual Environment** at UTSA and in the San Antonio community with public Neuroscience educational events.

- **Collaborative Neuroscience** as a means to build innovative, multidisciplinary research programs.

Our goals for research align with and expand upon those of UTSA by emphasizing the reality that our faculty must compete and excel in a larger context than the institution alone; we focus on developing the national scientific stature of our faculty as the single most effective means to research excellence for the institution.

Research Environment: Cores.

The **Opto-Excitability Core** and **2-Photon Microscopy Lab** continue to build research capacity for our Investigators. Both are available for use by Neuroscience researchers at UTSA.

The Opto-Excitability core serves investigators requiring fabrication and/or live animal implantation of optrodes or chronic multi-channel electrodes for neuroscience research applications. The core is under the direction of Carlos Paladini and has an online sign-up that fills up fast.

The 2-Photon Microscopy Lab is comprised of two multi-photon imaging systems fully equipped for in vitro electrophysiology and live tissue imaging. Initially erected by the NIH/NCRR RCMI grant, as of 2012 the core became fully supported and maintained by the Neurosciences Institute, under the direction of Fidel Santamaria.

An exciting development this past year is the addition of a **Behavioral Core** to the UTSA Neuroscience research community. The core is a VPR asset that falls under the Brain Health Initiative. It is unaffiliated with the institute in official terms, however we are eager to help publicize its value to our research groups. Carlos Paladini directs the core and can answer questions about instrumentation and usage.
Career Mentoring: Weekly Meetings.
Our flagship program of weekly research & mentorship meetings continued to shepherd grants, collaboration and professional development. They began as a program development exercise in 2005 to build the 2007-2012 NINDS Specialized Neuroscience Research Program, but now extend well beyond the scope of that program. They serve as a weekly 2-hour rotating forum to support all level of trainees and faculty in their grant development, manuscript preparation, and career development. All faculty and students are welcome at meetings to review and discuss any manner of neuroscience writing, research and to develop collaborations. Meetings are at 2pm every Friday in the Dean’s conference room (BSE 1.110). If you’d like to reserve a meeting, or be added to the mailing list, contact Salma Quraishi.

Intellectual Environment: Neuroscience Symposium.
The annual research symposium is a cornerstone of our year. In October, Matt Wanat hosted Dopamine Neurons & Motivated Behavior. On the panel were: Stan Floresco (UBC), Patricia Janak (JHU), Hitoshi Morikawa (UT Austin), Nao Uchida (Harvard), and the host. The symposium was attended by 96 researchers, fellows, and students from various departments at UTSA, UTHSCSA and UT Austin, and presented a colorful array of talks that connected circuit and neuron resolution events to animal learning and choice behavior. Stay tuned for 2017’s symposium, which will be hosted by Isabel Muzzio.

Public Outreach Lecture.
Our push for neuroscience outreach on campus and in the community involves branding UTSA as the major repository for brain science in San Antonio. The centerpiece of this effort is our annual Distinguished Neuroscience Lecture for the Public. The format is an evening lecture by a luminary in the field, whose scientific research and charismatic delivery underscore to inquisitive San Antonians that Neuroscience research holds the key to discovering our human capacities and innovation in the realm of health and disease. Please be sure to publicize these to your classes and your labs as key events in the intellectual life of our campus and community. 2016’s lecture was hosted by Isabel Muzzio, and featured one of the greats: Howard Eichenbaum. His talk, The Hippocampus in Space and Time, presented a vision of the hippocampus as using shifting multidimensional maps that go beyond spatially defined place cells to form generalized associations. The lecture was held in the Main Building on September 20th, and was attended by undergraduates, researchers and members of the public. The 2017 Public Lecture is coming up in April, and will feature a talk on Parkinson’s Disease research by D. James Surmeier of Northwestern University.
**Neuroscientists Talk Shop Podcast**

The Institute continues to build online multimedia content by adding to its **Neurobiology Podcast series**, Neuroscientists Talk Shop. The series features prominent external Neuroscientists in scholarly yet accessible discussion with a group of core UTSA Neurobiologists. Discussions often emphasize the history and process behind the research, as well as underscoring emanating ideas and off-the-record musings. They are a unique forum for speculation and critical analysis in the language that researchers naturally use. The podcast’s facebook page currently lists 133 “likes”, including 3 added this week. In 2016, 16 new episodes were posted and are available on iTunes, bringing the total number of episodes to 160 at the close of 2016 (see Box, p 5).

**Undergraduate Research.**

The Institute is assisting in undergraduate recruitment by building web resources featuring academic and research guidance, and by hosting a mixer for undergraduate neurobiology students to network with our faculty. Institute leadership has also met regularly with interested students to help advise students personally. In 2015, rapidly growing demand for undergraduate Neuroscience research opportunities led us to secure some generous funding from the Mind Science Foundation to support summer undergraduate research internships. In Summer of 2016, the MSF fellowship supported undergraduate Sriharshini Muthukumar for an extended research stint in the Muzzio Lab.

We have received frequent requests from high school students for summer research positions. If Investigators would like to mentor such students, let us know, and we can steer them in your direction.

**DOPAMINE & MOTIVATED BEHAVIOR SYMPOSIUM**

L to R: Hitoshi Morikawa, Nao Ushida, Matt Wanat, Stan Floresco, Patricia Janak (hidden), Charles Wilson.

**FIDEL SANTAMARIA**

Fidel’s year was full of mileage and milestones. He and PhD student Zhen Yang published a biophysical mechanism by which LTD increases intrinsic excitability in ex vivo cerebellar Purkinje neurons. The interplay of synaptic and intrinsic excitability they describe presents a powerful means by which Purkinje neurons might sort, process and transmit densely patterned parallel fiber input.

He spent the summer as a Visiting Scholar at the Korea Institute of Science and Technology, working with Keiko Tanaka-Yamamoto of the Center for Functional Connectomics. Their collaboration is developing new tools to comprehensively map spatial and synaptic influences on information processing in the parallel fiber/Purkinje cell network. The project is an ambitious technical layering of optogenetic targeting tools with electrophysiology, imaging and computer modeling, and is the subject of a pending international NIH R01 grant.

In his theoretical playground, Fidel continued to toy with time in ion channel subspace by exploring what might result if Hodgkin-Huxley conductance gates retain the recent activity history of a neuron by displaying power law dynamics. Modeling conductances with fractional derivatives yielded a diversity of action potential waveforms to constant input in a model neuron. This work presents an alluring principle for thinking about how timescales interact in the CNS to produce the expansive computational capacity of neurons. BME PhD student David Stockton co-authored this PLoS Computational Biology paper; the two also produced a Neuroinformatics article this year testing frameworks for implementing real time, cloud-based neural simulation software for use by neuroscientists.

Fidel maintains a solid stable of NSF funding (see Box, p 4), including a collaborative grant with Todd Troyer and Nicole Wicha.
### NIH AWARDS * New awards

* F31DA041303 Pt: Gomez, Jorge A
  Astrocitary Mechanism for regulating dopaminergic burst firing $32,793

R01DA030530 Pt: Paladini, Carlos A
  The synaptic origin of reward prediction error signal in dopaminergic neurons $276,482

R01DA038453 Pt: Paladini, Carlos A
  Mechanisms of cocaine hypersensitivity following chronic DBH inhibition $183,696 (awarded 12/15)

R01MH107293 Pt: Paladini, Carlos A
  Cellular Mechanisms of cocaine neuron bursting $330,750

R00DA033386 Pt: Wanat, Matthew J
  CRF and Stress Modulation of Phasic Dopamine Release and Behavior $235,939

R21HD007984 Pt: Wicha, Nicole Y
  Brain and behavior of multiplication fact learning in bilingual children $181,912

P50NS047085 Pt: Wilson, Charles J (Udall Center)
  Desynchronization of Basal Ganglia Neurons by Stimulation $205,382

* R35NS097185 Pt: Wilson, Charles J
  Oscillations and Resonance in Basal Ganglia Circuits $661,500

### NSF AWARDS Award totals, all continuing

EF 1137897 Pt: Santamaria, Fidel
  Analyzing Neuronal Activity When Classical Reaction-Diffusion Breaks Down $608,000

IOS 1208029 Pt: Santamaria, Fidel
  US-German Collaboration: The effects of chloride dynamics in cerebellar computation $550,104

IOS 1516648 Pt: Santamaria, Fidel
  BRAIN Initiative Awardees Meeting in Bethesda $41,490

DBl 1451032 Co-Is: Santamaria, Troyer, Wicha BRAIN EAGER: Analyzing and Modeling Power-Law Behaviors in Neuroscience $300,000

IOS 1458662 Co-PI: Jaffe. Understanding How BK Potassium Channels Enhance a Neuron’s Input/Output Function. $52,479

### FY2016 NON FEDERAL AWARDS


UT BRAIN Initiative. Pt: Paladini. Advanced Stimulation Therapeutics for Parkinson’s Disease $42,452


### Collaborations. In 2016 our Investigators held 5 funded multi-institution collaborations: A multi-PI NIH R01 grant (Emory), an NIH-funded Morris K. Udall Center project (Northwestern), an NSF Collaborative grant (UTHSCSA), a UT Brain Initiative grant (UTHSCSA), and finally, an NSF multi-national grant with the German Ministry of Education and Research. Two others are underway, but pending funding (a P50 Center with UTHSCSA and an R01 with Korea Institute of Science & Technology).

A number of Investigators spent time in external research environments this year, engaged in technical and intellectual exchange. **Fidel Santamaria** spent the summer as a Visiting Scientist at the Korea Institute of Science & Technology (see Box, right). After spending his 2015 sabbatical as a Visiting Professor at Goethe University in Frankfurt, **Carlos Paladini** returned for a month in 2016 to continue his collaboration with Jochen Roeper, the Director of the Institute for Neurophysiology. The two are recording subthreshold membrane conductances in midbrain neurons of freely moving animals. **Nicole Wicha** spent her Fall sabbatical at UT Austin, doing fMRI studies with Communication Science & Disorder Chair, James Booth.

Internal collaborations are widespread in our group. Currently, one multi-investigator grant within our group is funded (NSF Brain Initiative; Drs. Santamaria, Troyer and Wicha). Members of our faculty routinely publish collaborative papers within and across institutions; in the current list of 2016 research articles, a majority are collaborative.

### Research Impact: Scholarly Output

Institute faculty generated at least 60 publications in 2016 (see Investigators in Press). These include 47 peer reviewed journal articles, 5 reviews articles, 2 previews, 5 book chapters and 1 e-book. **7 Neuro PhD students** (current & alum) appeared in press this year with 5 papers.

On a multimedia note, the Institute generated 16 research-themed podcasts as part of our Neuroscientists Talk Shop series. (see Box, p 5. for titles).

### Submissions & Awards

Kudos and thanks to the Investigators who submitted federal research grants through the Institute this year (Apicella, Beaudoin, Jaffe, Maroof, Muzzio, Oliva, Paladini, Santamaria, Stelly, Wanat, Wicha, Wilson). Congratulations and highest praise to the PhD students who submitted federal PhD training grants this year (Lefner, Morales).

Congratulations to new federal award grantees in 2016: **Charles Wilson (R35)** and **Jorge Gomez** (F31).
Kudos also to **Hyoung-gon Lee**, on a new Alzheimer’s Association award, and to all who maintain funding in our Institute from other non-federal sources: **David Jaffe**, **Carlos Paladini**, and **Charles Wilson**. A number of faculty have additional funding sources outside the Institute that are not credited in this report (**Wanat**, **Wicha**, **Lin**).

**People.** The neuroscience community at UTSA is ever expanding in number and scientific diversity, and this year’s additions are exciting and numerous.

The Brain Health Initiative brings to our ranks Associate Professor **Hyoung-gon Lee** and Assistant Professor **Asif Maroof**. Both bring fresh expertise in cellular neuroscience tools and approaches to our research community. Hyoung-gon transferred a mature program that examines aberrant cell cycle regulation in neurodegeneration, and Asif is building a new lab that leverages stem cells and transgenic technology to explore cortical circuit maturation and pathological processes in disease. Also new to the Institute this year is Chemistry faculty and Lutcher Brown Distinguished Chair, **Aimin Liu**. His lab works on metalloproteins and enzymatic signaling in neurological disorders.

2016 brought a promising new generation of postdocs: **Lamine Bouamarine** from Marseille (Paladini lab); **Danielle Dickson** from University of Illinois (Wicha lab); fresh recruit **Kah-cheung Leong** from Medical University of South Carolina (Muzzio Lab); and finally **Claire Stelly** from UT Austin (Wanat lab).

In Fall 2016 we welcomed a new crop of PhD students: **Merridee Lefner**, **Bryan Fowler**, **Celia Gagliardi**, **Matthew Wood**, **Jessica Perkins** and **Hector Zurita**. Some are familiar faces who got a head start as undergraduate researchers, while others are new to the scene. Welcome and good luck to all.

Also notable this year as an indicator of program growth is the addition of a number of new technical staff who are rounding out our research groups: **Ariel Schmid** (Paladini lab), **Graham Haug** (Wanat lab), and **Ashley Rawls** (Gaufo lab). They join veteran team members, **Sharmon Lebby** (Wilson Lab), **Angela Huang** (Lin Lab), and **Eric Cheng** (Gaufo lab) as essential components of our research teams.

In departures, Wilson lab PhD student **Soomin Song** successfully defended his dissertation this year. Much luck to him at NYU where he joins the Tritsch lab. Best wishes also to **Gerard Beaudoin** (formerly of Paladini lab) in his new job as Assistant Professor of Neuroscience at Trinity.

**MENTORING DATA**

Reported to be working in Institute labs:
- **29** undergraduates (Biology, Engineering and Psychology Majors)
- **18** MS/PhD students (4 MS, 14 PhD; Programs represented are Biology, Psychology, Biomedical Engineering);
- **5** Post doctoral Fellows.

**THE YEAR IN NUMBERS**

- **3** NEW awards received, 2 NIH, 1 foundation (asterisks, Box, p 4);
- **20** awards administered by the Institute; 16 active (new & continuing, Box, p 4), and 4 in NCE (not shown);
- **60** scientific publications; 47 journal articles, 5 reviews, 2 previews, 5 chapters, 1 e-book.
- **16** Research Podcasts
- **7** Neuro PhD students in press
- **15** proposals submitted; **12** to federal agencies (NSF & NIH);
- **1** multi-institution, collaborative Center grant submitted (NIH P50).

**2016 NTS PODCASTS**

Neuroscientists Talk Shop is the University of Texas at San Antonio’s Neurobiology Podcast, which showcases the current research of internationally renowned guest Neuroscientists. Each episode features a moderated discussion with a cross section of UTSA Neurobiology faculty, highlighting the featured guest’s research, and the state of the art in the field at hand. The following 16 episodes were added in 2016:

#145 Hillel Adesnik (Berkeley)
#146 Mark Bevan (Northwestern)
#147 Jagmeet Kanwal (Georgetown)
#148 Gordon MG Shepherd (Northwestern)
#149 Christopher Olsen (Med College of WI)
#150 Javier Medina (Baylor)
#151 Russel Ray (Baylor)
#152 Lee Goldstein (Harvard)
#153 Laura Colgin (UT Austin)
#154 Jim Lechleiter (UTHSCSA)
#155 Howard Eichenbaum (Boston U)
#156 Susan Patterson (Temple U)
#157 Yoland Smith (Yerkes)
#158 Art Riegel (MUSC)
#159 Geoff Schoenbaum (NIDA)
#160 David Weishenker (Emory)

Main Site: [http://snrp.utsa.edu/NeuroScience](http://snrp.utsa.edu/NeuroScience)
Investigators in Press

Publications1 2016 • Neuro PhD student paper


1 Citations are presented alphabetically by Institute Investigator. For multiple authors, publication appears by last author; if last author is not an Investigator, then entry appears by first listed Institute Investigator.

http://neuroscience.utsa.edu
37. Yu L, Rodriguez RA, Chen LL, Chen LY, Perry G, McHardy SF, Yeh CK. 1,3-propanediol binds inside the channel to inhibit water permeation through aquaporins. Protein Sci. 2016 Feb;25(2):433-41.

BOOK CHAPTERS 2016