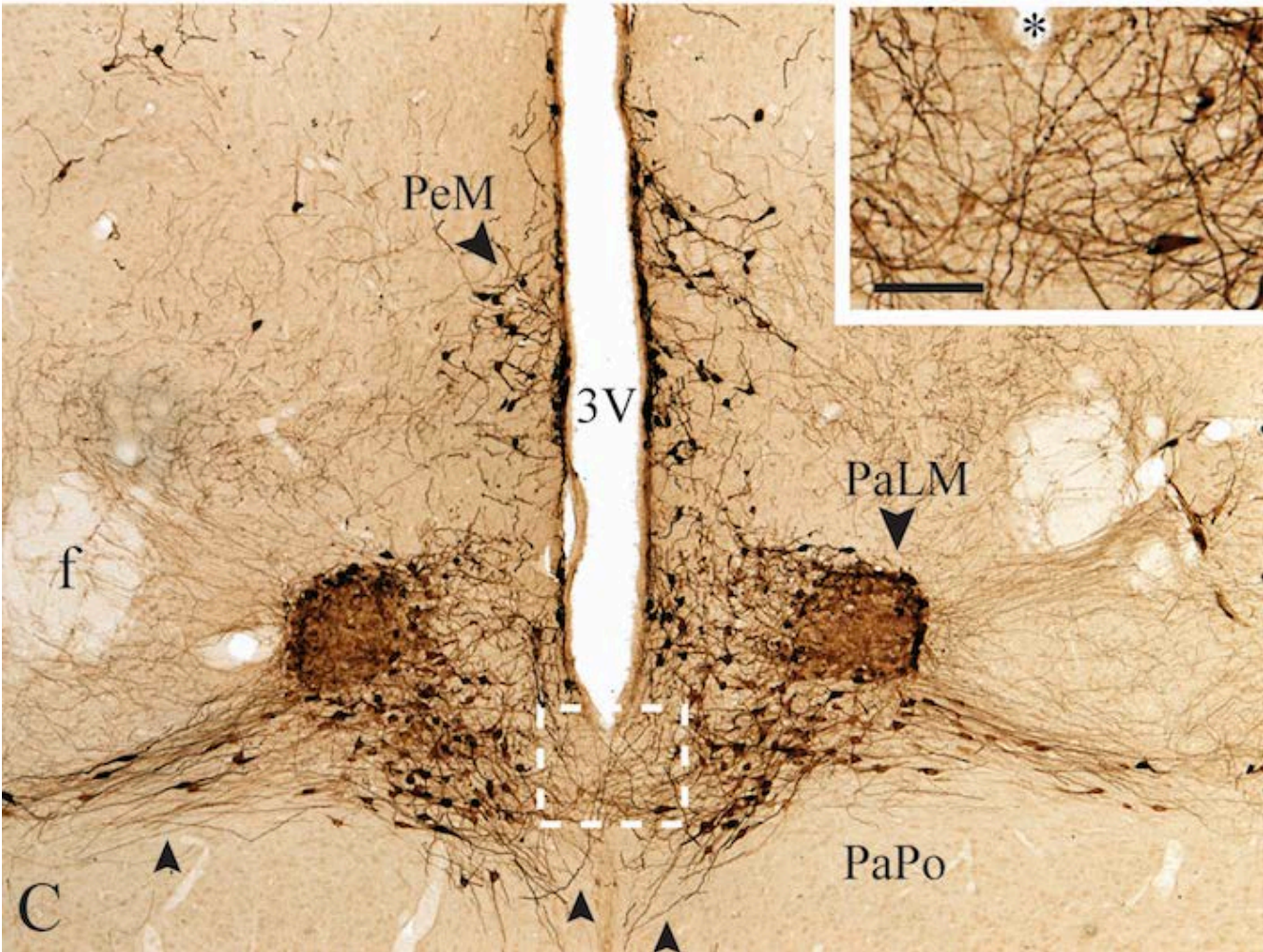




THEC Neuroscience Center of Excellence



Annual Report to the
Tennessee Higher Education Commission (THEC)
Fiscal Year 2017 (7/1/2016-6/30/2017)

I. MISSION STATEMENT

The Neuroscience Institute at UTHSC is supported by the Neuroscience Center of Excellence, one of several Centers of Excellence established by the Tennessee Higher Education Commission in 1985. Our mission is to develop and support multidisciplinary research and training in neuroscience. We feature basic science and clinical members spanning 10 departments and foster neuroscience research through support of neuroscience track graduate students and postdocs, the Neuroscience Imaging Center and Behavioral Core, a robust seminar series, and start-up packages for new faculty. The brain is the final frontier of biology. Scientific inquiry has produced remarkably detailed knowledge of the physical world and much of the life sciences, including details of the human genome. However, our knowledge of the brain is far from complete. The nature and mechanisms of consciousness, thought, perception, learning, memory and many diseases of the nervous system are poorly understood. Neuroscience is now at an exciting threshold of discovery and unprecedented growth. The resulting explosion of information is rapidly increasing our understanding of the basic mechanisms of brain structure and function. This emerging knowledge is helping us discover effective treatments and even cures for some neurological diseases. More information concerning the Institute is available at:

<https://www.uthsc.edu/neuroscience/>

II. EXECUTIVE SUMMARY

In FY 2017 the NI/Center of Excellence successfully helped recruit Dr. Tauheed Ishrat to the Department of Anatomy and Neurobiology. Dr. Ishrat is an R01-funded stroke researcher who came from the University of Georgia as an associate professor. We have committed funds toward Dr. Ishrat's seed package, which he can begin spending after Sept. of 2018. We continued to promote neuroscience research by providing the weekly Neuroscience Seminar series, mixing outside with UTHSC and affiliated faculty. We provided matching funds to 7 graduate students and saw our second Neuroscience track graduate student in the past 2 years, Jordan Ross, awarded an NIH F31 predoctoral fellowship with the mentorship of NI member Max Fletcher. Currently, the only students with F31 fellowships at UTHSC are in the Neuroscience Track (and a third just received a notice of award for FY 2018!). Currently, there are 18 students in the Neuroscience Track of the Integrated Biomedical Sciences Ph.D. program. We also supported 9 postdocs with matching funds in the Departments of Anatomy and Neurobiology, Neurology, Ophthalmology, and Pharmacology, and 4 undergraduate summer Neuroscience merit fellows from Christian Brothers University, Rhodes College, and the University of Memphis. We supported the Neuroscience Imaging Center, a cost-recovery facility providing the only transmission electron microscope (JEOL 2000) on campus, a state of the art Zeiss 710 laser-line confocal microscope, and a Neurolucida 3-dimensional reconstruction workstation. We supplement the service contracts of these instruments to keep user fees low, and we support the Imaging Center's technical director. With the National Institute on Drug Abuse, we co-sponsored a day-long community outreach program for high school students and teachers entitled "Drugs Change the Brain, but not in a Good Way".

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IV. ADMINISTRATIVE STRUCTURE

Director: Professor William E. Armstrong, PhD
Department of Anatomy and Neurobiology

Co-Director: Professor Tony Reiner, PhD
Department of Anatomy and Neurobiology

Administrative Specialist: Summer Hillman/Celeste Smith

Program Coordinator/

IT Specialist: Brandy Fleming, MS

Neuroscience Executive Committee:

Matthew Ennis, PhD, Professor and Chair, Department of Anatomy and Neurobiology

Mark LeDoux, MD, PhD, Professor, Department of Neurology

Jon Jaggar, PhD, Professor, Department of Physiology

Tony Reiner, PhD, Professor and NI Co-Director, Department of Anatomy and Neurobiology

Susan E. Senogles, PhD, Professor, Department of Molecular Sciences

Jeff Steketee, PhD, Professor, Department of Pharmacology

Jim Wheless, MD, Professor, Chief of Pediatric Neurology and LeBonheur Chair, Le Bonheur Hospital/UTHSC

Center Address:

University of Tennessee Health Science Center
875 Monroe Ave., Suite 426, Wittenborg Building
Memphis TN 38163
(901) 448-5960
<http://www.uthsc.edu/neuroscience>

V. FACULTY OF THE NEUROSCIENCE INSTITUTE

The Neuroscience Institute is currently comprised of 88 faculty members in several different departments on the UTHSC campus, including those with primary appointments at St. Jude Children's Research Hospital and at the University of Memphis and Christian Brothers University, and one faculty member at UT Knoxville. Faculties are listed with each department; those with primary appointments outside UTHSC or UTK are so indicated. * indicates new member. We have added 5 new members this past FY, and lost 2 members.

Department of Anatomy and Neurobiology

William E. Armstrong, Ph.D., Professor and NI Director
John D. Boughter, Jr., Ph.D. Associate Professor
Joseph C. Callaway, Ph.D., Associate Professor
Viktor Chizhikov, Ph.D., Assistant Professor
Alessandra d'Azzo, Ph.D., Affiliated Professor (St. Jude)
Michael A. Dyer, Ph.D., Affiliated Professor (St. Jude)
Matthew Ennis, Ph.D., Professor and Chair
Malinda E. C. Fitzgerald, Ph.D., Adjunct Professor (Christian Brothers Univ.)
Max Fletcher, Ph.D., Associate Professor
Robert C. Foehring, Ph.D., Professor
Kristin Hamre, Ph.D., Associate Professor
Detlef Heck, Ph.D., Associate Professor
Marcia G. Honig, Ph.D., Professor
*Tauheed Ishrat, Ph.D., Associate Professor
Hitoshi Kita, Ph.D., Professor
Peter J. McKinnon, Ph.D., Affiliated Professor (St. Jude)
James I. Morgan, Ph.D., Affiliated Professor (St. Jude)
Anton J. Reiner, Ph.D., Professor and NI Co-Director
J. Paul Taylor, M.D., Ph.D., Affiliated Professor (St. Jude)
Robert S. Waters, Ph.D., Professor
Stanislav Zahkarenko, Ph.D. Affiliated Associate Professor (St. Jude)
Jian Zuo, Ph.D., Affiliated Professor (St. Jude)

Department of Biochemistry and Cellular and Molecular Biology, UT Knoxville

Rebecca A. Prosser, Ph.D., Professor

Department of Genetics, Genomics and Informatics

Robert W. Williams, Ph.D., UT-Oak Ridge National Laboratory Governor's Chair in Computational Genomics
Professor, and Chair

Byron Jones, Ph.D., Professor

Lu Lu, Ph.D., Associate Professor

*Megan Mulligan, Ph.D., Assistant Professor

Department of Medicine/Cardiology

Syamal Bhattacharya, Ph.D., Professor

Department of Molecular Sciences

Susan E. Senogles, Ph.D., Professor

Department of Neurology

Annie Chan, Ph.D., Assistant Professor

Michael Jacewicz, M.D., Professor

Mark S. LeDoux, M.D., Ph.D., Professor

Michael McDonald, Ph.D., Associate Professor

Thaddeus S. Nowak, Ph.D., Professor

Lawrence T. Reiter, Ph.D., Professor

Jack Tsao, M.D., Ph.D., Professor

Department of Neurosurgery

Frederick Boop, M.D., Professor and Chair

Department of Ophthalmology

Edward Chaum, M.D., Ph.D., Plough Foundation Professor

Rajashekhar Gangaraju, Ph.D., Assistant Professor

Monica M. Jablonski, Ph.D., Professor

Vanessa M. Morales-Tirado, Ph.D., Assistant Professor

*Nawajes Mandal, Ph.D., Associate Professor

Department of Pediatrics, Pediatric Neurology and LeBonheur Children's Hospital

Abbas Babajani-Feremi, Ph.D., Assistant Professor, Pediatrics, Le Bonheur

Joan Han, M.D., Associate Professor, Pediatrics, LeBonheur

Amy McGregor, M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Shalini Narayana, Ph.D., Associate Professor, Pediatric Neurology, Le Bonheur

Massroor Pourcyrus, M.D., Professor, Pediatrics, Le Bonheur

James W. Wheless, M.D., Professor and Chief of Pediatric Neurology, Le Bonheur

Department of Pharmaceutical Sciences

Duane D. Miller, Ph.D., Van Vleet Professor and Chairman

Bob Moore, Ph.D., Professor

Department of Pharmacology

Suleiman W. Bahouth, Ph.D., Professor

*Anna Bukiya, Ph.D., Assistant Professor

Hao Chen, Ph.D., Assistant Professor

Alex M. Dopico, M.D., Ph.D., Professor

Francesca-Fang Liao, Ph.D., Professor

Kafait U. Malik, Ph.D., Professor

Kazuko Sakata, Ph.D., Associate Professor

Burt Sharp, M.D., Van Vleet Professor

Jeffery Steketee, Ph.D., Professor

Steven J. Tavalin, Ph.D., Associate Professor

Fu-Ming Zhou, M.D., Ph.D., Associate Professor

*Changhoon Jee, Ph.D., Assistant Professor

Department of Physiology

Julio Cordero-Morales, Ph.D., Assistant Professor

Ioannis Dragatsis, Ph.D., Associate Professor

Jonathan Jaggar, Ph.D., Professor

Charles W. Leffler, Ph.D., Professor

Kristen M.S. O'Connell, Ph.D., Associate Professor

Helena Parfevona, Ph.D., Professor

Valeria Vásquez, Ph.D. Assistant Professor

Paula Dietrich, Ph.D., Assistant Professor

Department of Preventative Medicine

Khyobeni Mozhui, Ph.D., Assistant Professor

University of Memphis

Ramin Homayouni, Ph.D., Adjunct Professor, Neurology

St. Jude Children's Hospital (see Departments Above for Affiliated Appointments)

Michael Dyer, Ph.D., Professor

Alessandra D'Azzo, Ph.D., Professor

Peter McKinnon, Ph.D., Professor

James Morgan, Ph.D., Professor

J. Paul Taylor, M.D., Ph.D., Professor

Stanislav Zakharenko, Ph.D., Associate Professor

Jian Zuo, Ph.D., Professor

VI. GRADUATE STUDENTS & POSTDOCTORAL STUDENTS

Graduate Students: The NI supports the Neuroscience Graduate Program, which is a division of the Intergrated Biomedical Sciences program at UTHSC. A description of the Neuroscience program can be found at: (https://www.uthsc.edu/anatomy-neurobiology/neuroscience_graduate_program.php). This program is directed by NI members Dr. Jay Callaway (Track Director) and Dr. Matt Ennis (Program head and Chair of Anatomy and Neurobiology). Students in this track take Function Neuroanatomy and 2 of 3 additional Core courses (Cellular Neuroscience, Behavioral Neuroscience, Developmental and Molecular Neuroscience), in addition to Statistics and Ethics. In addition, all graduate students must take the Neuroscience Seminar Class each year until they pass their qualifying exam, and all students participate in the student Neuroscience Symposium class every year, where they present their research. All students in good standing in the program are awarded matching stipends for at least 2 years (typically, years 3 and 4) of their Ph.D. research with the exception of students working at St. Jude Children's Hospital, which provides their complete stipend. Currently, the program has 20 students, 2 of whom are at St. Jude's, while the others are placed with mentors at UTHSC in Anatomy and Neurobiology, Neurology, Ophthalmology and Pharmacology. Five senior students will receive their Ph.D. in 2017-2018.

Three students have been awarded nationally competitive NIH F31 predoctoral fellowships: Sarah Neuner, Jordan Ross, and Jessica Baker. Ms. Neuner is doing her research on the genetics of Alzheimer's Disease, in Jackson Laboratories, Bar Harbor, Maine, but remains a student in our program. Ms. Ross works with Dr. Max Fletcher in Anatomy and Neurobiology on olfaction (**See Appendix 4**). Ms. Baker works with Dr. Kristin Hamre in Anatomy and Neurobiology on development effects of alcohol. Financial details on support can be found in

the budget. Neuroscience students are also active in community activities: recently Nick Saites (Mentor, John Boughter of Anatomy and Neurobiology) was given the 2016 Harold Love Award for Community Service from THEC. A summary of this award and Nick's activity can be found in **Appendix 4**.

Postdoctoral Students: The NI supports matching postdoctoral fellowships to some extent every year. Currently we are supporting 9 postdocs at varying amounts (see Budget). The NI Mentors are located in the departments of Anatomy and Neurobiology, Neurology, Ophthalmology, and Pharmacology. The UT Neuroscience Institute competitively awarded 2017 Postdoctoral/Research Associate Awards to the following seven candidates with mentors in the Neuroscience Institute: Safa Bouabid (Pharmacology, Dr. Fu-Ming Zhou), Mounir Bendahmane (Anatomy and Neurobiology, Dr. Maxwell Fletcher), Kamalika Mukherjee (Pharmacology, Dr. Kafait Malik), Dhruva Pathak (Anatomy and Neurobiology, Dr. Robert Foehring), Mohammad Khan (Neurology, Dr. Mark LeDoux), Raji Lenin (Ophthalmology, Dr. Raja Gangaraju), and Mohammed Moustafa (Ophthalmology, Dr. Monica Jablonski). The awardees were selected by the Neuroscience Executive Committee based on their productivity and promise in neuroscience research. Further information on postdoctoral awards is available at https://www.uthsc.edu/neuroscience/postdoc_awards.php.

VII. PROGRAM OVERVIEW AND ACCOMPLISHMENTS

OVERVIEW

Organizational Structure: The Tennessee Higher Education Commission Neuroscience Center of Excellence comprises the administrative core and financial engine of the University of Tennessee Health Science Center's (UTHSC) Neuroscience Institute (NI), which is located within UTHSC's College of Medicine in Memphis, TN. Prof. William E. Armstrong is the Director, and Prof. Tony Reiner is the Co-Director. The Director reports to the Executive Dean of the College of Medicine at UTHSC, currently Interim Dean, Steven J. Schwaab, M.D. (also UTHSC Chancellor), and the Vice Chancellor of Research, Steven Goodman, Ph.D. Physically the NI is housed within twelve different departments in the College of Medicine and some other UT departments, with an administrative suite in Rm 426 Wittenborg Building at UTHSC. Affiliated members reside at UT Knoxville, Oak Ridge National Laboratory, St. Jude Children's Hospital, LeBonheur Children's Hospital, Christian Brothers University, and at the University of Memphis.

Dr. Armstrong supervises Ms. Brandy Fleming, MS, who is our Program Coordinator and also functions as our IT specialist. Ms. Fleming and Dr. Armstrong supervised our administrative assistant Summer Hillman and her replacement, Celeste Smith. With Ms. Fleming's help, the administrative assistant organizes the seminar series including all travel arrangements, assists in ordering and billing, and handles NI official correspondence. The Neuroscience Imaging Center is managed by TJ Hollingsworth, PhD. Dr. Hollingsworth reports to Dr. Armstrong.

History: The Neuroscience Center of Excellence at UTHSC was established in 1985 and designated an accomplished Center of Excellence by the Tennessee Higher Education Commission in 1988. In 1998, the

Neuroscience Center of Excellence was designated as the University of Tennessee Neuroscience Institute, with dedicated space in the Wittenborg, Link and Johnson buildings. The Neuroscience Center of Excellence award was designed to support graduate and postdoctoral education, to recruit and provide initial support to new neuroscience faculty, to renovate laboratory facilities, to purchase research equipment, to host symposia and a weekly seminar series, and to support community outreach programs such those associated with Brain Awareness Week. The Director from 1985-2002 was Dr. Steven T. Kitai (retired, 2002). Dr. David Smith was named director from 2002-2006 (deceased, Sept. 2006), and Dr. William Armstrong has been director since 2006.

The program brings together neuroscience faculty members from the Departments of Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pediatrics, Pharmaceutical Sciences, Pharmacology, Physiology, Psychiatry, and Surgery, and Department of Biochemistry and Cellular and Molecular Biology at the University of Tennessee, Knoxville. Strong affiliations exist with Methodist University Hospital, Le Bonheur Children's Hospital, St. Jude's Children Hospital, the University of Memphis, Rhodes College, Christian Brother's University and the Urban Child Institute. The interdepartmental nature of the program and the collaborations it fosters provide the cross-disciplinary environment necessary for high quality neuroscience research.

Neuroscience Administrative Suite and Conference Rooms: The NI maintains an administrative suite with offices for the Program Coordinator, Administrative Assistant, and the Director of the Behavioral Core in the Wittenborg building, 4th floor (Room 426). The suite also contains 2 conference rooms, one large room for classes, lab meetings, and large committee meetings, and a smaller room for small meetings. We also maintain a breakroom for the NI staff, as well as staff from the animal vivarium located in the basement of the Wittenborg building, which houses animals for Anatomy and Neurology, Physiology, and Neurology faculty.

Neuroscience Imaging Core: The NI maintains a full-service Imaging Center (<https://www.uthsc.edu/neuroscience/imaging-center/index.php>) housing confocal microscopes, electron microscopes, 3-dimensional reconstruction workstations, microtomy facility and lab and office space for the Director of the Imaging Core, Dr. Hollingsworth, located on the 3rd floor of the Link Building. This is a cost recovery facility that NI supports in order to keep costs low. Scheduling is on-line.

Neuroscience Behavioral Core: This core is located on the 3rd floor of Wittenborg building (<https://www.uthsc.edu/neuroscience/behavioral-core/>), and is managed by Professor Mike McDonald of Neurology. NI helped recruit Dr. McDonald several years ago, providing him 3 years of salary support and an office. Dr. McDonald is extremely well funded and successful and personally trains users in the great variety of testing equipment available in this core. This core is free of use to any UTHSC faculty, but NI occasionally supplies equipment and software on an as-needs basis. Scheduling is on-line.

Neuroscience Institute Web Site: Our Program Coordinator, Ms. Brandy Fleming, maintains the NI website (<https://www.uthsc.edu/neuroscience/>). This site contains information about our cores, the graduate and

postdoctoral support programs, undergraduate fellowships, conference room and core on-line scheduling, faculty funding, spotlights on new faculty, seminars and symposia, and a full list of participating departments and NI faculty members. Ms. Fleming maintains 2 servers for NI members. One server is for file exchange for users of the Imaging Center. All images are digitally acquired from our confocal and electron microscopes, and these can be uploaded to this site by users, stored for a month, and downloaded at their convenience during that period. She also maintains a server for archiving all of our NI business.

Areas of Neuroscience Research

Neurological and Neurodegenerative Disorders:

Neurological diseases include disorders of the nervous system arising from nervous system malfunction or degeneration. Current areas of focus within NI include: cellular and network physiology of basal ganglia in the context of Parkinson's disease, traumatic brain and eye injury, stroke, neuronal dysfunction and death in Huntington's disease, the molecular biology of synaptogenesis in dystonia, and animal models of Alzheimer's disease.

Faculty:

A. Babajani-Feremi	<i>Ped. Neurology</i>	I. Dragatsis	<i>Physiology</i>
R. Homayouni	<i>Neurology/U of Memphis</i>	D. Heck	<i>Anat. & Neurobiology</i>
M. Jacewicz	<i>Neurology</i>	B. Jones	<i>Gen., Genetics & Inform.</i>
M. LeDoux	<i>Neurology</i>	H. Kita	<i>Anat. & Neurobiology</i>
S. Naryana	<i>Ped. Neurology</i>	F-F. Liao	<i>Pharmacology</i>
L. Reiter	<i>Neurology</i>	T. Nowak	<i>Neurology</i>
T. Ishrat	<i>Anat. & Neurobiology</i>	A. Reiner	<i>Anat. & Neurobiology</i>
		J. Wheless	<i>Ped. Neurology</i>

Excitable Properties of Neurons

Behavior, mentation and physiological homeostasis are all a function of neuronal activity in the nervous system. This activity can be encoded by membrane polarity or in the rates and patterns of neuronal action potentials. Information is passed among neurons through synaptic transmission.

Faculty:

R. Foehring	<i>Anat. & Neurobiology</i>	H. Kita	<i>Anat. & Neurobiology</i>
W. Armstrong	<i>Anat. & Neurobiology</i>	R. Scroggs	<i>Anat. & Neurobiology</i>
J. Callaway	<i>Anat. & Neurobiology</i>	S. Tavalin	<i>Pharmacology</i>
J. Cordero-Morales	<i>Physiology</i>	R. Waters	<i>Anat. & Neurobiology</i>
A. Dopico	<i>Pharmacology</i>	V. Vásquez	<i>Physiology</i>

M. Ennis *Anat. & Neurobiology* D. Heck *Anat. & Neurobiology*

Sensory Information Processing

Sensory systems extract information from the environment and provide the nervous system an interface with the outside world. Understanding the way in which this information is represented in neuronal activity is the focus of this research group, which includes the study of olfaction, taste, pain, and vision.

Faculty:

M. Ennis	<i>Anat. & Neurobiology</i>	R. Nelson	<i>Anat. & Neurobiology</i>
J. Boughter	<i>Anat. & Neurobiology</i>	R. Scroggs	<i>Anat. & Neurobiology</i>
J. Cordero-Morales	<i>Physiology</i>	R. Waters	<i>Anat. & Neurobiology</i>
M. Fletcher	<i>Anat. & Neurobiology</i>	V. Vásquez	<i>Physiology</i>
D. Heck	<i>Anat. & Neurobiology</i>		

Vision and Retina

Understanding the normal function of the eye and the way this process is affected by disease is the primary interest of this group. Researchers are addressing the normal development of the eye as well as the genetic basis of function and disease.

Faculty:

E. Chaum	<i>Ophthalmology</i>	V. Morales-Tirado	<i>Ophthalmology</i>
M. Dyer	<i>Anat. & Neurobiology/St. Jude</i>	A. Reiner	<i>Anat. & Neurobiology</i>
M. Fitzgerald	<i>Anat. & Neurobiology/CBU</i>	R. Gangaraju	<i>Ophthalmology</i>
M. Jablonski	<i>Ophthalmology</i>	R. Williams	<i>Gen., Genomics & Inform.</i>
N. Mandal	<i>Ophthalmology</i>	J. Zuo	<i>Anat. & Neurobiology/St. Jude</i>

Neurogenetics and Development

This group is interested in gaining a deeper understanding of the origins of the impressive structural and functional complexity, diversity, and plasticity of the nervous system. Experimental and technical expertise of this group is broad, ranging from genetic and molecular analysis of the early stages of central and peripheral nervous system development to sophisticated functional assays of neuronal plasticity in response to environmental manipulations.

Faculty:

R. Williams	<i>Gen, Genomics, & Inform</i>	L. Lu	<i>Anat. & Neurobiology</i>
J. Boughter	<i>Anat. & Neurobiology</i>	P. McKinnon	<i>Anat. & Neurobiology/St. Jude</i>
V. Chizhikov	<i>Anat. & Neurobiology</i>	J. Morgan	<i>Anat. & Neurobiology/St. Jude</i>
A. d'Azzo	<i>Anat. & Neurobiology/St. Jude</i>	K. Mozui	<i>Preventative Medicine</i>

I. Dragatsis	<i>Physiology</i>	A. Reiner	<i>Anat. & Neurobiology</i>
K. Hamre	<i>Anat. & Neurobiology</i>	L. Reiter	<i>Neurology</i>
J. Han	<i>Pediatrics/Le Bonheur</i>	M. Mulligan	<i>Gen, Genomics, & Inform</i>
R. Homayouni	<i>Neurology/U Memphis</i>	R. Waters	<i>Anat. & Neurobiology</i>

Mental and Addictive Disorders

Mental and addictive disorders are due to changes in normal brain function. This research group collaboratively explores changes in brain function that might explain mental disorders, such as depression and addiction, and drug-induced changes in brain function that may be responsible for relieving mental disorders or producing addiction.

Faculty:

H. Chen	<i>Pharmacology</i>	B. Sharp	<i>Pharmacology</i>
A. Dopico	<i>Pharmacology</i>	J. Steketee	<i>Pharmacology</i>
K. Hamre	<i>Anat. & Neurobiology</i>	S. Tavalin	<i>Pharmacology</i>
K. Sakata	<i>Pharmacology</i>	F. Zhou	<i>Pharmacology</i>

ACCOMPLISHMENTS

Faculty support and recruitment: NI provided \$384,000 in seed money toward the seed packages for Dr. Catherine Kaczorowski and Dr. Victor Chizhikov, distributing these funds over the past 5 years. These two faculty were very successful in both obtaining NIH R01 funding, and Dr. Kaczorowski also received substantial foundation monies. However, Dr. Kaczorowski left UTHSC in October of 2016, and her unexpended funds were used to support postdocs, and will also provide seed money (\$150,000) to Tauheed Ishrat, a new stroke researcher recruited into Anatomy and Neurobiology. Dr. Ishrat will start drawing on these funds in September of 2018. Dr. Chizhikov is entering his 5th year of support this Fall (2017), and will finish his seed money by September 1, 2018. Dr. Chizhikov was awarded an R01 from NIH in July of 2016, and he was promoted to associate professor and awarded tenure July 1, 2017.

Acquisition of Equipment for Cores: In the past, NI has contributed matching funds for multi-user equipment grants, including those obtained from NIH for an electron microscope, for two confocal microscopes, for a computerized light microscope for three-dimensional neuronal reconstructions, and for a high resolution digital camera attachment for the electron microscope, all are located in the Neuroscience Imaging Core and are maintained and supervised by a dedicated Technical Manager (Dr. TJ Hollingsworth) provided by the NI. This year we purchased a new water chiller for the JEOL 2000 electron microscope with matching funds contributed by the Vice Chancellor for Research, Steven Goodman. We also purchased a new automated 3-dimensional reconstruction system from Microbrightfield (NeuroLucida 360). The web site for the Imaging Center is

constantly refreshed: (<http://www.uthsc.edu/neuroscience/imaging-center/index.php>) and features on line scheduling for equipment use.

Graduate Student Recruiting: Our interdisciplinary Graduate Neuroscience Track attracts outstanding applicants from around the country, with an emphasis on those in the Mid-South. We currently have 20 Neuroscience students, including 4 new students who entered in the Fall of 2017, and 5 students who entered in the Fall of 2016. This year we will graduate another 3 senior students from the program, Cameron Ogg, Nick Saites, Stu McAfee, and in the last two years we graduated Eunhee Kim, Bin Wang, Sumana Chintalapudi, Bo Wang, Brittany Wright, and Yudong Gao. Our recruiting flyer can be found at the end of **Appendix 4**, but through surveying students we find that most discover the program based on the Web site.

Postdoctoral Research Awards. The NI provided matching funds on a competitive basis for 9 postdoctoral fellows or research associates for FY 2016-2017. These awards are \$10,000-\$15,000 each.

NI Neuroscience Seminar series and Symposia: This series is a major mechanism for interaction among neuroscience faculty and students and brings outstanding neuroscientists from around the world to the UTHSC campus. During the 2016-2017 academic year, the NI sponsored the weekly Neuroscience Seminar Series, hosting 25 seminars. Of these, 16 neuroscientists from outside UTHSC and 9 within the NI presented their recent research findings to UT faculty and students. The NI seminar series serves as the basis for a graduate course, Neuroscience Seminar (ANAT 821), which is attended by all neuroscience track IPBS graduate students and within which they read papers by and meet with the visiting scientists (course director Hao Chen). This seminar program is vital to the Neuroscience Track of the Graduate Program and to the entire UT neuroscience community, serving to keep our faculty and students abreast of recent developments and, perhaps even more important, to showcase our strengths to national and international leaders in neuroscience research visiting our campus. NI also assists in the Student Seminar course (course director William Armstrong), where students give seminars and receive critical feedback from their colleagues. A complete list of FY 2016-2017 seminar speakers and their topics are provided in **Appendix 3**.

On Oct. 1, 2016, NI co-sponsored a community outreach symposium for Brain Awareness Day for local high schools entitled “**Drugs Change the Brain, But Not in a Good Way**” (see **Appendix 4**). This was a 2-phase event that first provided lectures in the morning from two outside speakers, Profs. Ronald Cowan, M.D., Ph.D. (Vanderbilt) and Mary Torregrossa, Ph.D. (Univ. of Pittsburgh) and an internal speaker, Dr. Hao Chen (UTHSC), who co-organized the event for NI along with Drs. Armstrong and Reiner. After the talks, which concerned the effects the drugs ecstasy, marijuana, and nicotine have on the brains and behaviors of humans and animal models, students were served lunch, then were given hands on laboratory demonstrations illustrating human brain and brain sections (with microscopes), and descriptive posters detailing parts of the brain and the

areas affected by these drugs. The symposium was co-sponsored by the National Institute on Drug Abuse and the Center for GWAS in Outbred Rats.

Undergraduate Neuroscience Merit Scholarships: These are given to outstanding undergraduates at Rhodes College, Christian Brothers University (CBU) and University of Memphis. The Rhodes and CBU scholars work on independent projects for their undergraduate thesis. The scholars (and mentors) for 2016-2017 were Connor Dorian, Rhodes College (Mentor: Dr. Tony Reiner), Avani Alapati, Rhodes College (Mentor Dr. Larry Reiter) and Megan Beane, University of Memphis (Mentor: Dr. Detlef Heck). New scholars are picked every Spring.

VIII. GOALS AND FUTURE PLANS

Faculty Support and Recruitment: **1)** We have been given permission by Chancellor and Interim Executive Dean of the College of Medicine, Steve Schwab, to recruit a mid-level neuroscientist into the Department of Anatomy and Neurobiology for FY2018. Our proposal was to recruit into our strongest extramurally supported group, Neurodegenerative disease. The Chair of Anatomy and Neurobiology, Matt Ennis, will spearhead this recruitment with the assistance of Drs. Armstrong and Reiner of NI. **2)** NI has committed seed funds and administrative salary to help the College of Medicine and the Research Office in recruiting a new faculty member into the Department of Neurology, Aaron Bowman currently of Vanderbilt University. Dr. Bowman has yet to make a definite decision, but he will play a leadership role in NI if he makes this move. **3)** NI will continue the final year of seed money support for Dr. Victor Chizhikov, who recently received his first R01 from NIH. **4)** NI members Drs. Armstrong, Reiner and Ennis will mentor newly recruited faculty member, Tauheed Ishrat, as he prepares to write a second NIH grant. His seed money support will start in Sept. of 2018.

Core Support: NI will continue to support the Imaging Center (including Microtomy lab), and Behavioral Core. This requires collecting and processing user fees, paying service contracts, and repairing/replacing equipment. The Imaging Center was moved to swing space this past spring, and in November we will move into newly renovated space. Further Details are found in the budget for FY2018 below.

Graduate Student Support and Recruiting: We will recruit 4-6 new students into the Neuroscience Track for Fall of 2018. These interviews run from January-March of 2018. As detailed below for FY2018, we will support 6 students in their 3rd or 4th year during the next fiscal year. Dr. Armstrong will continue to run the Neuroscience Student Symposium class with Drs. Ennis and Heck, and Drs. Chen and Mulligan will run the Neuroscience Seminar Series class for graduate students. The NI offers **travel stipends** to any Neuroscience student or supported postdoc for a national meeting if they are the first or presenting author of a talk or poster.

Postdoctoral Research Awards. We have committed funds for up to 6 postdocs in FY 2017-2018. Requests for applications will be sent out in November for a January start date. These applications are competitive, and ranked by the NI Executive Committee. See Budget for FY2018 for further details.

NI Neuroscience Seminar Series and Symposia: We will continue to run the Neuroscience Seminar Series and already have our Fall Schedule with seminars that started in September. We will solicit nominations from the faculty for Spring in November. We expect to host around 25 seminars, the majority of which will feature guests from out of town. Rather than a Symposium this year, we are considering a workshop in January concerning in vivo imaging methods for rodent research.

Undergraduate Research Fellows: We will support up to 4 undergraduate research fellows from Rhodes College, Christian Brothers University, or University of Memphis. Applications will be processed in the Spring of 2018.

IX. BUDGET (see Schedule 7, page 20)

A. Budget FY 2017. The FY2017 THEC appropriated budget for the UTNI was \$584,774. We carried forward \$264,973 from the previous year for a total budget of \$849,747. This carryover reflects amounts encumbered but unspent for Graduate Stipends that were picked up previously by NI and are now picked up by UTHSC for the student's first 18 months, and monies encumbered to support two new faculty hires for whom we still provided seed packages (Kaczorowski and Chizhikov).

This past FY, we expended \$522,763 total personnel costs (including salaries and fringe). Personnel costs include administrative supplements for the NI Director (who also oversees the NI Imaging Center and its technical director Dr. Hollingsworth), the NI Co-Director, a full-time Program Coordinator/ IT specialist, a full time Administrative Specialist, a full time Technical Manager of Imaging Center, 8 graduate student matching support stipends and 9 matching postdoctoral fellowships (see below).

Students: We awarded matching funds for 8 graduate stipends to PIs with Neuroscience track graduate students (\$113,086). The mentors were located in the departments of Anatomy and Neurobiology, Ophthalmology, and Pharmacology.

Postdoctoral Support: We provided matching funds for 3 postdoctoral fellows, at ~\$15,000 each, 1 at \$10,000, 3 at \$5,000 each, and 2 at ~\$39,000 each (~\$149,000). The NI Mentors are located in the departments of Anatomy and Neurobiology, Ophthalmology, and Pharmacology.

Neuroscience Imaging Center: Currently, the NI Imaging Center is run by Dr. TJ Hollingsworth. We supplement our cost-recovery program to keep user fees low, helping to pay the service contracts on our JEOL 2000 Electron Microscope, the Zeiss 710 confocal microscope, and the Neurolucida workstation. This year our cost-recovery program took in \$51,212, which is used against the fees needed to pay the service contracts on the Zeiss 710 (\$22,689) and the JEOL 2000 (\$16,800). We also support the Neurolucida workstation but have a current 3-year service agreement paid last year.

Neuroscience Behavioral Core: The procedures for use and available equipment can be viewed at: <http://www.uthsc.edu/neuroscience/behavioral-core/index.php>. Due to the generally low cost of maintenance (PIs provide their own technicians to use the equipment), NI has not yet instituted fee for service in this facility.

Neuroscience Microtomy Core: The equipment available for use can be viewed at: <http://www.uthsc.edu/neuroscience/imaging-center/microtomy.php>.

Seminars and Symposia: Additional funds went to support travel/lodging/meals (\$16,889) and honoraria (\$2,800), for the Neuroscience Seminar series (**Appendix 3**), and our collaboration with the National Institute on Drug Abuse, co-sponsoring a community outreach symposium for high school students and teachers on Oct. 1, 2016 entitled “Drugs Change the Brain, but not in a Good Way”.

Research Projects: We continued to pay startup funds for our two new faculty, Drs. Chizhikov and Kaczorowski, who were awarded \$195,000 and \$189,000, respectively from NI for FYs 2013-2018. Their unspent funds are reflected in our carryover. This past fall, Dr. Kaczorowski moved to Jackson Labs in Maine, leaving a balance in her startup that we used primarily to offer more postdoctoral matching funds and to hold in reserve for our new recruit, Tauheed Ishrat. Dr. Chizhikov will finish his startup effective Sept. 2018.

Neuroscience Undergraduate Fellowships: NI supported three undergraduate Neuroscience Merit Fellows at \$4000 each (total, \$12,000) for summer research.

Travel Awards: \$5,472 in travel awards for graduate students and postdoctoral fellows were awarded.

B. Budget FY 2018. We will carryover \$219,145 to the coming fiscal year, and have been appropriated \$598,802 for a total of \$817,947. In addition to providing support for all the NI staff (Program Coordinator, Administrative Assistant, and Imaging Center Manager) as detailed for FY2017, here is a breakdown of the major anticipated projects for FY2018:

Graduate Students: For the coming year, we have awarded matching funds for 6 graduate stipends to PIs with Neuroscience track graduate students. Mentors are located in the departments of Anatomy and Neurobiology and Ophthalmology. The NI match is ~\$14,500 each for 3 of these (~\$43,500), and variable amounts for the remaining 3 students (~\$3,600, \$4,900, \$7,600), making an expected total of ~\$60,000.

Postdoctoral Support: This year we expect to provide funds for 4 postdoctoral fellows (\$10,000-15,000 each for a total of ~\$50,000 for the coming year. Some of these will be given to postdoctoral awardees from last year since we typically fund 2 years, depending on progress. In addition, we have allotted another \$30,000 for new postdoctoral fellows, bringing the total expected postdoctoral expenditures to \$80,000 during FY2018.

Neuroscience Imaging Center: We will pay the service contracts on the JEOL 2000 (\$16,800) and for the Zeiss 710 Confocal (\$22,689). Our Microbrightfield contract for the NeuroLucida workstation is already paid for 2018.

Neuroscience Behavioral Core: We will continue to support the Behavioral Core in FY2018, but expenditures are expected to be minimal. However, should a need arise for additional equipment, or for a part-time assistant to help run behavioral studies, NI would consider additional funding assuming a fee for service program were approved and initiated.

Neuroscience Microtomy Core: Currently we have no contracts for any of the Microtomy Core equipment, and will pay for repairs as needed. In the past, service has been on the order of \$1500 for the cryostat.

NI Faculty: We will provide administrative supplements to Drs. Armstrong and Reiner. Dr. Chizhikov will have ~\$80,000 to spend in FY2018 and part of FY2019. Although NI has committed funds to Dr. Tauheed Ishrat, who began in January of 2017, we don't expect Dr. Ishrat to draw on these funds until Sept. of 2018 (FY2019)

Research Projects and Bridge Funding: We can provide small amounts of bridge assistance, but this will be limited by our commitments to seed packages for previously recruited faculty (Chizhikov), as well as the commitment to newly recruited member, Tauheed Ishrat.

Neuroscience Seminar Series and Symposium: We will offer our weekly Neuroscience Seminar series and expect to spend between \$20-25,000 on speaker travel, hotel, and honorarium fees.

Undergraduate Research Fellows: We will continue to fund summer Undergraduate Neuroscience Merit Fellowships to Rhodes College, Christian Brothers University, or University of Memphis students who are doing research projects in Neuroscience towards fulfilling their degree requirements at \$4,000 each (from 2-4 awards, depending on qualifications, \$12-16,000).

Schedule 7

CENTERS OF EXCELLENCE ACTUAL, PROPOSED, AND REQUESTED BUDGET

Institution:

UT Health Science Center

Center:

Neuroscience

Expenditures	FY 2016-17 Actual			FY 2017-18 Proposed			FY 2018-19 Requested		
	Matching	Appropriations	Total	Matching	Appropriations	Total	Matching	Appropriations	Total
Salaries									
Faculty	\$188,792	\$5,000	\$193,792	\$192,568	\$5,000	\$197,568	\$196,419	\$5,000	\$201,419
Other Professional	\$232,869	\$129,026	\$361,895	\$237,526	\$217,396	\$454,923	\$242,277	\$223,918	\$466,195
Clerical/ Supporting	\$0	\$128,106	\$128,106	\$0	\$24,120	\$24,120	\$0	\$24,844	\$24,844
Assistantships	\$391,678	\$173,992	\$565,670	\$399,512	\$163,609	\$563,121	\$407,502	\$75,000	\$482,502
Total Salaries	\$813,339	\$436,124	\$1,249,463	\$829,606	\$410,125	\$1,239,731	\$846,198	\$328,762	\$1,174,960
Longevity (Exclude from Salaries and include in Benefits)	\$0	\$2,959	\$2,959	\$0	\$3,195	\$3,195	\$0	\$3,350	\$3,350
Fringe Benefits	\$0	\$112,795	\$112,458	\$0	\$104,080	\$104,080	\$0	\$72,439	\$72,439
Total Personnel	\$813,339	\$551,878	\$1,364,880	\$829,606	\$517,400	\$1,347,006	\$846,198	\$404,551	\$1,250,749
Non-Personnel									
Travel	\$0	\$15,092	\$15,092	\$0	\$25,000	\$25,000	\$0	\$25,750	\$25,750
Software	\$0	\$20,340	\$20,340	\$0	\$500	\$500	\$0	\$515	\$515
Books & Journals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Supplies	\$0	\$24,213	\$24,213	\$0	\$150,934	\$150,934	\$0	\$60,866	\$60,866
Equipment	\$0	\$8,012	\$8,012	\$0	\$0	\$0	\$0	\$0	\$0
Maintenance	\$0	\$22,689	\$22,689	\$0	\$45,800	\$45,800	\$0	\$52,174	\$52,174
Scholarships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Consultants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Renovation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Imaging Center Recovery	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Services & Expenditures	\$0	-\$45,722	-\$45,722	\$0	\$20,000	\$20,000	\$0	\$52,000	\$52,000
Contractual & Special Services	\$0	\$9,931	\$9,931	\$0	\$20,000	\$20,000	\$0	\$20,600	\$20,600
Insurance & Interest	\$0	\$3,424	\$3,424	\$0	\$7,000	\$7,000	\$0	\$7,548	\$7,548
Media Processing	\$0	\$463	\$463	\$0	\$600	\$600	\$0	\$618	\$618
Communication	\$0	\$1,138	\$1,138	\$0	\$950	\$950	\$0	\$979	\$979
Professional Services & Memberships	\$0	\$16,800	\$16,800	\$0	\$27,063	\$27,063	\$0	\$361	\$361
Rental & Insurance	\$0	\$2,346	\$2,346	\$0	\$2,700	\$2,700	\$0	\$2,781	\$2,781
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Non-Personnel	\$0	\$78,725	\$78,725	\$0	\$300,547	\$300,547	\$0	\$224,192	\$224,192
GRAND TOTAL	\$813,339	\$630,602	\$1,443,606	\$829,606	\$817,947	\$1,647,553	\$846,198	\$628,742	\$1,474,940
Revenue									
New State Appropriation	\$0	\$584,774	\$584,774	\$0	\$598,802	\$598,802	\$0	\$628,742	\$628,742
Carryover State Appropriation	\$0	\$264,973	\$264,973	\$0	\$219,145	\$219,145	\$0	\$0	\$0
New Matching Funds	\$813,339	\$0	\$813,339	\$829,606	\$0	\$829,606	\$846,198	\$0	\$846,198
Carryover from Previous Matching Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$813,339	\$849,747	\$1,663,086	\$829,606	\$817,947	\$1,647,553	\$846,198	\$628,742	\$1,474,940

X. FACULTY PUBLICATIONS

The Neuroscience faculty at UTHSC is consistently productive, both in terms of peer-reviewed publications and participation in the national neuroscience community. Lists of the ~ **200 peer-reviewed journal publications** during the last academic year, as cited in PubMed are presented in **Appendix 2**. These PubMed-cited publications do not include the many chapters, reviews and other articles written by NI faculty. NI faculty members are indicated in **bold** in **Appendix 2**.

XI. EXTRAMURAL FUNDING OF NEUROSCIENCE FACULTY

The UT Neuroscience Institute is a concentrated, interdepartmental Neuroscience program. For FY2016-2017, Anatomy and Neurobiology (10 funded Neuroscientists) was ranked **16th in the category of Neuroscience departments among public university medical schools in NIH funding, and 13th among public university Anatomy and Cell Biology Departments**. Other participating NI departments that are well ranked include **Physiology** (4 funded NI members), which was ranked **18th among public medical schools**, and **Pharmacology** (6 funded members), **ranked 39th in public universities** (Statistics from Blue Ridge Institute for Medical Research). The total annual grant dollars (total costs) held by faculty associated with the NI at UTHSC (*i.e.*, excluding affiliate members, such as St. Jude, and excluding grants in no cost extensions) during FY2016-2017 was **\$15,538,466**. The research grants (current year total costs) currently held by individual faculty of the NI are listed by Principal Investigator in **Appendix 1**. These values are reported to us by Research Administration at UTHSC. **Appendix 4** includes some examples of recently awarded faculty.

APPENDIX 1
External Funding of Neuroscience Institute Faculty
FY 2016-2017

2017 Neuroscience Center of Excellence Annual Report

Lead Investigator	Department	Title	Sponsor	Award Number	Begin Date	End Date	Total Amount
Armstrong, William	Anatomy and Neurobiology	Reproductive Plasticity in Oxytocin Neurons	HHS - NIH - NICHD - Eunice Kennedy Shriver National Institute of Child Health and Human Development	5R01HD072056-05	1/1/2017	12/31/2017	\$280,125
Armstrong, William	Anatomy and Neurobiology	Reproductive Plasticity in Oxytocin Neurons	HHS - NIH - NICHD - Eunice Kennedy Shriver National Institute of Child Health and Human Development	5R01HD072056-05 REVISED	1/1/2017	12/31/2017	\$31,125
Boughter, John	Anatomy and Neurobiology	Taste responses in defined cell types in gustatory cortex	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	1R21DC015202-02 REVISED	12/1/2016	11/30/2017	\$19,000
Boughter, John	Anatomy and Neurobiology	Taste responses in defined cell types in gustatory cortex	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	1R21DC015202-02	12/1/2016	11/30/2017	\$171,000
Bukiya, Anna	Pharmacology	Cholesterol control of alcohol-induced cerebral artery constriction	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5R01AA023764-03 REVISED	5/1/2017	4/30/2018	\$34,200
Bukiya, Anna	Pharmacology	Cholesterol control of alcohol-induced cerebral artery constriction	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5R01AA023764-03	5/1/2017	4/30/2018	\$307,800
Cham, Edward	Ophthalmology	Nanoplatfom and Modeling of the Subretinal and RPE Microenvironment in AMD	HHS - NIH - NEI - National Eye Institute	5R01EY024063-03	5/1/2017	4/30/2018	\$522,269
Cham, Edward	Ophthalmology	Nanoplatfom and Modeling of the Subretinal and RPE Microenvironment in AMD	HHS - NIH - NEI - National Eye Institute	5R01EY024063-03 REVISED	5/1/2017	4/30/2018	\$58,029
Chen, Hao	Pharmacology	Integrated GWAS of Complex Behavioral and Gene Expression Traits in Outbred Rats	University of California, San Diego (UCSD)	73257613 S9001369 SP50DA037844 Am2	5/1/2016	4/30/2017	\$13,894
Chizhikov, Viktor	Anatomy and Neurobiology	Mesenchymal-neuroepithelial interactions in the developing telencephalon.	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R01NS093009-02	6/1/2017	5/31/2018	\$335,905
Dopico, Alejandro	Pharmacology	Ethanol Actions on SLO Channels from Arteries vs. Brain	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5 R37 AA011560-19	7/1/2016	6/30/2017	\$421,170
Fletcher, Max	Anatomy and Neurobiology	Cholinergic modulation of olfactory bulb glomerular sensitivity	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	5R01DC013779-03-REVISED	3/1/2017	2/28/2018	\$36,325
Fletcher, Max	Anatomy and Neurobiology	Cholinergic modulation of olfactory bulb glomerular sensitivity	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	5R01DC013779-03	3/1/2017	2/28/2018	\$326,920
Foehring, Robert	Anatomy and Neurobiology	Slowly Inactivating K+ Channels in Neocortical Pyramidal Cells	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R01NS044163-13	7/1/2016	6/30/2017	\$338,415
Gangaraju, Raja Shekhar	Ophthalmology	Vascular and Neuronal Repair with Adipose Stromal Cells in Retinopathy	HHS - NIH - NEI - National Eye Institute	5R01EY023427-05	4/1/2017	3/31/2018	\$343,614
Gangaraju, Raja Shekhar	Ophthalmology	Vascular and Neuronal Repair with Adipose Stromal Cells in Retinopathy	HHS - NIH - NEI - National Eye Institute	5R01EY023427-05 REVISED	4/1/2017	3/31/2018	\$36,386
Gangaraju, Raja Shekhar	Ophthalmology	Therapeutic efficacy of adipose derived stem cell conditioned media in the mouse model of traumatic brain injury	Cell Care Therapeutics, Inc.	ADSC-CM	10/8/2016	10/7/2017	\$56,783
Gangaraju, Raja Shekhar	Ophthalmology	Adipose-Derived Stem Cells Alleviate Visual Deficits in Blast Injury	DOD - Department of Defense	W81XWH-16-1-0778	9/30/2016	9/29/2019	\$1,499,996
Hamre, Kristin	Anatomy and Neurobiology	Maternal genotype, choline intervention, & epigenetics in Fetal Alcohol Syndrome	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5R01AA023508-02 REVISED	3/1/2017	2/28/2018	\$29,618
Hamre, Kristin	Anatomy and Neurobiology	Maternal genotype, choline intervention, & epigenetics in Fetal Alcohol Syndrome	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5R01AA023508-02	3/1/2017	2/28/2018	\$266,548
Heck, Detlef	Anatomy and Neurobiology	Effects of traumatic brain injury on temporal dynamics of brain activity and learning	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R21NS091752-02	9/1/2016	8/31/2017	\$190,000
Ishrat, Tauheed	Anatomy and Neurobiology	Mechanisms and therapeutic targets of neurovascular injury in hyperglycemic stroke	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	7R01NS097800-01 transfer balance	6/1/2017	5/31/2021	\$226,221
Ishrat, Tauheed	Anatomy and Neurobiology	Mechanisms and therapeutic targets of neurovascular injury in hyperglycemic stroke	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	7R01NS097800-02	6/1/2017	5/31/2018	\$332,500
Jablonski, Monica	Ophthalmology	Dutch Belted Rabbit Efficacy/Tolerability Model	Tisbury Pharmaceuticals LTD		5/24/2017	5/23/2018	\$45,160
Jablonski, Monica	Ophthalmology	Evaluation and inhibition of efflux pumps expressed on the blood ocular barrier.	University of Mississippi (UM)	UM Sub# 15-03-031 Mod2 1R01EY022120-01A1	3/1/2017	2/28/2018	\$62,935
Jablonski, Monica	Ophthalmology	Loading of diazoxide into chitosan nanoparticles and testing in mice and rats	Radikal Therapeutics, Inc.	Amendment 2	9/1/2016	12/1/2016	\$3,987
Jaggar, Jonathan	Physiology	Vascular Control by K+ Channel Trafficking	HHS - NIH - NHLBI - National Heart, Lung, and Blood Institute	5R01HL067061-14	5/1/2016	4/30/2017	\$375,000
Jaggar, Jonathan	Physiology	Blood pressure regulation by smooth muscle cell ion channels	HHS - NIH - NHLBI - National Heart, Lung, and Blood Institute	1R01HL133256-01A1	4/1/2017	3/31/2018	\$380,000
Jones, Byron	Genetics, Genomics & Informati	Neural Toxicity of Paraquat is Related to Iron Regulation in Midbrain	HHS - NIH - NIEHS - National Institute of Environmental Health Sciences	5R01ES022614-05	5/1/2017	4/30/2018	\$573,026
Jones, Byron	Genetics, Genomics & Informati	Genetics of Chronic Mild Stress and Alcohol Consumption	HHS - NIH - NIAAA - National Institute on Alcohol Abuse and Alcoholism	5R01AA021951-03	9/1/2016	8/31/2017	\$375,165
Kaczorowski, Catherine	Anatomy and Neurobiology	Systems Genetics to Identify Modifiers of Alzheimer's Disease	BrightFocus Foundation	Year One	7/1/2016	10/3/2016	\$100,000

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Kita, Hltoshi	Anatomy and Neurobiology	Synaptic Transmissions in the Basal Ganglia	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5 R01 NS057236-09 Revised	5/1/2017	4/30/2018	\$32,813
Kita, Hltoshi	Anatomy and Neurobiology	Synaptic Transmissions in the Basal Ganglia	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5 R01 NS057236-09	5/1/2017	4/30/2018	\$295,312
Ledoux, Mark	Neurology	Genetics and Biology of CIZ1 in Cervical Dystonia	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R01NS082296-04	7/1/2016	6/30/2017	\$328,125
Ledoux, Mark	Neurology	DNA Repair in Dystonia	DOD - Department of Defense	W81XWH-17-1-0062	6/1/2017	11/30/2018	\$304,000
Ledoux, Mark	Neurology	A randomized, double-blind, placebo-controlled trial of urate-elevating inosine treatment to slow clinical decline in early Parkinson's disease	Massachusetts General Hospital	Prot No. INO-PD-P3-2014 1U01NS090259-02S1 Mod2	6/8/2017	6/30/2017	\$1,450
Ledoux, Mark	Neurology	SD-809-C-18 Study of SD-809 (Dutetrabenazine) for the Treatment of Moderate to Severe Tardive Dyskinesia	Auspex Pharmaceuticals	SD-809-C-20 Am5	3/13/2017	8/20/2017	\$51,380
Ledoux, Mark	Neurology	A Phase 2 study of Nelotanserin versus placebo in patients with dementia with Lewy bodies (DLB) experiencing REM sleep behaviors (RBD)	Axovant Sciences, Inc.	RVT-102-2002	6/5/2017	6/5/2018	\$71,660
Ledoux, Mark	Neurology	A Multicenter, Multinational Study to Evaluate the Efficacy and Safety of Laquinimod (0.5, 1.0 and 1.5 mg/day) as Treatment in Patients with Huntington's Disease.	Teva Pharmaceutical Industries, Ltd.	Protocol # TV5600-CNS-20007	8/29/2016	9/1/2017	\$327,656
Leffler, Charles	Physiology	Newborn Cerebral Hemorrhage and Arachidonate Metabolites	HHS - NIH - NHLBI - National Heart, Lung, and Blood Institute	2 R01 HL042851-26	1/1/2017	12/31/2017	\$391,496
Li, Wei and *Duane Miller	Pharmaceutical Sciences	Targeting the colchicine site in tubulin for advanced melanoma	HHS - NIH - NCI - National Cancer Institute	5R01CA148706-07	1/1/2017	12/31/2017	\$328,942
Li, Wei and *Duane Miller	Pharmaceutical Sciences	Targeting the colchicine site in tubulin for advanced melanoma	HHS - NIH - NCI - National Cancer Institute	5R01CA148706-07 Revised	1/1/2017	12/31/2017	\$36,551
Liao, Francesca-Fang	Pharmacology	Endothelial eNOS-deficient mice as chronic cerebral hypoperfusion model	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R21NS091593-02	9/1/2016	8/31/2017	\$190,000
Liao, Francesca-Fang	Pharmacology	Is HSF1 the key in mediating Hsp90 inhibitor effect in AD?	HHS - NIH - NIA - National Institute on Aging	5R01AG049772-03 Revised	5/15/2017	4/30/2018	\$28,044
Liao, Francesca-Fang	Pharmacology	Is HSF1 the key in mediating Hsp90 inhibitor effect in AD?	HHS - NIH - NIA - National Institute on Aging	5R01AG049772-03	5/15/2017	4/30/2018	\$252,396
Malik, Kafait	Pharmacology	Angiotensins, Prostaglandins, Adrenergic Interactions	HHS - NIH - NHLBI - National Heart, Lung, and Blood Institute	5 R01 HL19134-42	3/1/2017	2/28/2018	\$579,576
Mandal, Nawajes	Ophthalmology	Sphingolipid Metabolism and Signaling in the Retina	HHS - NIH - NEI - National Eye Institute	7R01EY022071-06	7/16/2016	3/31/2017	\$251,268
Mandal, Nawajes	Ophthalmology	Sphingolipid Signaling in Corneal Wound Healing and Fibrosis	University of Oklahoma Health Sciences Center (OUHSC)	RS20142345-02 R21EY025256	7/15/2016	3/31/2017	\$21,351
Mandal, Nawajes	Ophthalmology	Protective Effect of FTY720 in Animal Models of Human Retinal Degeneration	Foundation Fighting Blindness	C-NMT-0818-0599-UOK09	8/1/2016	7/31/2017	\$31,875
McDonald, Michael	Neurology	Effects of glycomacropeptide on memory and Alzheimer-related neuropathology	HHS - NIH - NIA - National Institute on Aging	1R01AG054562-01	4/1/2017	3/31/2018	\$311,600
McDonald, Michael	Neurology	Effects of glycomacropeptide on memory and Alzheimer-related neuropathology	HHS - NIH - NIA - National Institute on Aging	1R01AG054562-01 REVISED	4/1/2017	3/31/2018	\$68,400
McDonald, Michael	Neurology	Effects of modified erythropoietin on cognition and neuropathology	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	1R01NS094595-02	6/1/2017	5/31/2018	\$384,046
McDonald, Michael	Neurology	Effects of modified erythropoietin on cognition and neuropathology	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	1R01NS094595-01A1 Revised	7/1/2016	5/30/2017	\$48,768
McDonald, Michael	Neurology	Effects of intracranial rAAV.Neu3 on dementia and neuropathology	HHS - NIH - NIA - National Institute on Aging	5R21AG051032-02	7/1/2017	5/31/2018	\$190,000
Morales-Tirado, Vanessa	Ophthalmology	St. Baldrick's Foundation Summer Fellowship Award	St. Baldrick's Foundation	Award ID: 529031	6/5/2017	8/21/2017	\$5,000
Narayanan, Ramesh and *Duane Miller	Medicine-hematology and *Pharmaceutical Sciences	Discovery and Development of SARDs	GTx, Inc.	SARDs Am2	11/10/2016	3/1/2017	\$358,170
Neuner, Sarah	Anatomy and Neurobiology	Identification of Genetic Modifiers of Neuronal Deficits and Memory Failure in Alzheimer's Disease.	HHS - NIH - NIA - National Institute on Aging	5F31AG050357-03	7/1/2017	6/30/2018	\$43,576
O'Connell, Kristen	Physiology	Modulation of AGRP Neuronal Excitability: Role of Diet and Body Weight	HHS - NIH - NIDDK National Institute and Digestive and Kidney Diseases	5R01DK102918-03	6/1/2016	5/31/2017	\$380,625
Parfenova, Elena	Physiology	Astrocyte functions in neonatal brain	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	1R01NS101717-01A1	7/1/2017	6/30/2018	\$332,500
Reiner, Anton	Anatomy and Neurobiology	Development of DNzyme Gene Therapy for Huntington's Disease	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R21NS098137-02	6/1/2017	5/31/2018	\$228,000
Reiter, Lawrence	Neurology	An in vivo chemical screen for seizure suppression in Duplication 15q syndrome.	HHS - NIH - NICHD - Eunice Kennedy Shriver National Institute of Child Health and Human Development	1R21HD091541-01	4/1/2017	3/31/2018	\$190,000
Reiter, Lawrence	Neurology	Gene Expression Analysis in PWS Subject Derived Dental Pulp Stem Cell Neurons.	Foundation for Prader -Willi Research		2/1/2017	1/31/2018	\$75,600
Ross, Jordan	Anatomy and Neurobiology	Fear learning-induced transformations of olfactory bulb odor representations and behavioral generalization	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	1F31DC016485-01	7/1/2017	6/30/2018	\$43,576
Ross, Jordan	Anatomy and Neurobiology	Fear learning-induced transformations of olfactory bulb odor representations and behavioral generalization	HHS - NIH - NIDCD - National Institute on Deafness and Other Communication Disorders	1F31DC016485-01 Revised	7/1/2017	6/30/2018	\$468
Vasquez, Valeria	Physiology	Studying prolonged nociceptors activation by TRPV1 combining a spider toxin and C. elegans	US-Israel Binational Science Foundation	2015221	9/1/2016	8/31/2017	\$36,800

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Williams, Robert	Genetics, Genomics & Informati	Translational Systems Genetics of Mitochondria, Metabolism and Aging	HHS - NIH - NIA - National Institute on Aging	5R01AG043930-05	6/15/2017	5/31/2018	\$499,912
Williams, Robert	Genetics, Genomics & Informati	A Unified High Performance Web Service for Systems Genetics and Precision Medicine	HHS - NIH - CSR - National Center for Scientific Review	1R01GTM123489-01A1	4/15/2017	3/31/2018	\$489,764
Youngentob, Steven	Anatomy and Neurobiology	Developmental Exposure Alcohol Research Center	Binghamton University State University of New York (SUNY)	5P50AA17823 Fdn Award # 75764	9/1/2016	8/31/2017	\$235,400
Zhou, Fuming	Pharmacology	Ion channel mechanisms of striatal dopaminergic motor stimulation	HHS - NIH - NINDS - National Institute of Neurological Disorders and Stroke	5R01NS097671-02	5/1/2017	4/30/2018	\$299,250
TOTAL							\$15,538,466

APPENDIX 2
Faculty Publications
FY 2016-2017

Peer-reviewed publications for 2016-2017 (cited in PubMed):

- Abbasi, S., Hudson, A. E., Maran, S. K., Cao, Y., Abbasi, A., **Heck, D. H.**, & Jaeger, D. (2017). Robust transmission of rate coding in the inhibitory Purkinje cell to cerebellar nuclei pathway in awake mice. *PLoS Comput Biol*, *13*(6), e1005578. doi:10.1371/journal.pcbi.1005578
- Akkhawattanangkul, Y., Maiti, P., Xue, Y., Aryal, D., Wetsel, W. C., Hamilton, D., Fowler, S. C., & **McDonald, M. P.** (2017). Targeted deletion of GD3 synthase protects against MPTP-induced neurodegeneration. *Genes Brain Behav*, *16*(5), 522-536. doi:10.1111/gbb.12377
- Al-Khalaf, M. H., Blake, L. E., Larsen, B. D., Bell, R. A., Brunette, S., Parks, R. J., Rudnicki, M. A., **McKinnon, P. J.**, Jeffrey Dilworth, F., & Megeney, L. A. (2016). Temporal activation of XRCC1-mediated DNA repair is essential for muscle differentiation. *Cell Discov*, *2*, 15041. doi:10.1038/celldisc.2015.41
- Alabaster, K., Fred Bugg, M., Splavski, B., **Boop, F. A.**, & Arnautovic, K. I. (2017). The suboccipital ligament. *J Neurosurg*, 1-9. doi:10.3171/2016.10.JNS162161
- Alam, G., Miller, D. B., O'Callaghan, J. P., **Lu, L.**, **Williams, R. W.**, & **Jones, B. C.** (2016). MPTP neurotoxicity is highly concordant between the sexes among BXD recombinant inbred mouse strains. *Neurotoxicology*, *55*, 40-47. doi:10.1016/j.neuro.2016.04.008
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- Allen, R. P., Donelson, N. C., **Jones, B. C.**, Li, Y., Manconi, M., Rye, D. B., Sanyal, S., & Winkelmann, J. (2017). Animal models of RLS phenotypes. *Sleep Med*, *31*, 23-28. doi:10.1016/j.sleep.2016.08.002
- Annunziata, I., & **D'Azzo, A.** (2017). Galactosialidosis: historic aspects and overview of investigated and emerging treatment options. *Expert Opin Orphan Drugs*, *5*(2), 131-141. doi:10.1080/21678707.2016.1266933
- Antonakakis, M., Dimitriadis, S. I., Zervakis, M., **Papanicolaou, A. C.**, & Zouridakis, G. (2017). Reconfiguration of dominant coupling modes in mild traumatic brain injury mediated by delta-band activity: A resting state MEG study. *Neuroscience*, *356*, 275-286. doi:10.1016/j.neuroscience.2017.05.032
- Arizpe, J. M., McKean, D. L., **Tsao, J. W.**, & Chan, A. W. (2017). Where You Look Matters for Body Perception: Preferred Gaze Location Contributes to the Body Inversion Effect. *PLoS One*, *12*(1), e0169148. doi:10.1371/journal.pone.0169148
- Armstrong, W. E.** (2017). Kisspeptin: a new peptidergic system regulating oxytocin neurons and their reproductive plasticity in the hypothalamo-neurohypophysial system. *J Physiol*, *595*(3), 611-612. doi:10.1113/JP273364
- Babajani-Feremi, A.** (2017). Neural Mechanism Underling Comprehension of Narrative Speech and Its Heritability: Study in a Large Population. *Brain Topogr*. doi:10.1007/s10548-017-0550-6
- Babajani-Feremi, A.**, **Wheless, J. W.**, Papanicolaou, J. W., Wang, Y., Fifer, M. S., Flinker, A., Korzeniewska, A., Cervenka, M. C., Anderson, W. S., Boatman-Reich, D. F., & Crone, N. E. (2016). Spatial-temporal functional mapping of language at the bedside with electrocorticography. *Neurology*, *87*(24), 2604. doi:10.1212/01.wnl.0000511287.40052.8d
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- Bigler, E. D., & **Tsao, J. W.** (2017). Mild traumatic brain injury in soldiers returning from combat. *Neurology*, 88(16), 1490-1492. doi:10.1212/WNL.0000000000003852
- Bisen, S., Seleverstov, O., Belani, J., Rychnovsky, S., **Dopico, A. M.**, & **Bukiya, A. N.** (2016). Distinct mechanisms underlying cholesterol protection against alcohol-induced BK channel inhibition and resulting vasoconstriction. *Biochim Biophys Acta*, 1861(11), 1756-1766. doi:10.1016/j.bbali.2016.08.013
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APPENDIX 3
Neuroscience Seminar Speakers
FY 2016-2017



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

NEUROSCIENCE SEMINAR SERIES SCHEDULE

FALL 2016

Victor Chizhikov, Ph.D.

September 13, 2016

Assistant Professor

Department of Anatomy & Neurobiology

UTHSC

Title: "Genetic analysis of brain development and developmental brain disorders"

Paul Garrity, Ph.D.

September 20, 2016

Host: John Boughter

Professor

Department of Life Sciences

Brandeis University

Title: "From hot and spicy to cold and clammy: thermal and chemical detection in *Drosophila*"

Christine Denny, M.S., Ph.D.

September 27, 2016

Host: Sarah Neuner

Assistant Professor

Department of Psychiatry

Columbia University

Title: "Optogenetic activation of dentate gyrus memory traces rescued age-related cognitive decline"

Eva Redei, Ph.D. October 4, 2016
Host: Hao Chen
Professor
Department of Psychiatry & Behavioral Science
Northwestern university Feinberg School of Medicine

Title: "Lessons learned from a polygenic rat model of major depression"

TBA. October 11, 2016

Title: "TBA"

Byron Jones, Ph.D. October 18, 2016
Professor
Department of Genetics, Genomics & Informatics
UTHSC

Title: "Genetics of Paraquat Neurotoxicity"

Monica Jablonski, Ph.D. October 25, 2016
Professor
Department of Ophthalmology
UTHSC

Title: "Identifying Novel Drug Targets for Glaucoma Therapy"

Shekhar Gangaraju, Ph.D. November 1, 2016
Assistant Professor
Department of Ophthalmology
UTHSC

Title: TBA

Doug Bayliss, Ph.D.

November 8, 2016

Host: Robert Foehring

Professor & Chair

Department of Pharmacology

University of Virginia

Title: "Chemical regulation of breathing: cellular sensors and molecular detectors"

David Solecki, Ph.D.

November 29, 2016

Associate Professor

Department of Anatomy & Neurobiology

UTHSC

Title: TBA

Karen Ashe, M.D., Ph.D.

December 6, 2016

Host: Mike McDonald

Professor

Department of Neurology

University of Minnesota

Title: TBA

Bryan Traynor, M.D., Ph.D., MMSc, MRCPI

December 13, 2016

Host: Jack Tsao

Senior Investigator

Chief, Neuromuscular Diseases Research Section

Laboratory of Neurogenetics

National Institute of Aging

Title: "Genomics of amyotrophic lateral sclerosis"



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

**NEUROSCIENCE SEMINAR SERIES
SCHEDULE
SPRING 2017**

Jian Zuo, Ph.D.

January 24, 2017

Professor

Department of Anatomy & Neurobiology

St. Jude Children's Research Hospital

UTHSC

Title: "Cochlear hair cell regeneration and protection"

Cristine Czachowski, Ph.D.

January 31, 2017

Host: Dr. Hao Chen

Associate Professor

Department of Psychology

Indiana University

Title: "Risk Factor Endophenotypes for Differential Ethanol-Seeking and Drinking"

Mark LeDoux, M.D., Ph.D.

February 7, 2017

Professor

Department of Neurology

Department of Anatomy & Neurobiology

UTHSC

Title: "Movement Disorders: Novel Insights and Therapeutics from Genetics and Models"

Daoyun Ji, Ph.D.

February 21, 2017

Host: Dr. Fu-Ming Zhou
Associate Professor
Department of Molecular & Cell Biology
Department of Neuroscience
Baylor College of Medicine

Title: "From Hippocampal Place Cells to Spatial Memory Codes"

Robert Foehring, Ph.D.

February 28, 2017

Professor and Vice Chair
Department of Anatomy & Neurobiology
UTHSC

Title: "Dynamics of K channel function in identified populations of pyramidal neurons in neocortex"

Dezhi Liao, Ph.D.

March 7, 2017

Host: Dr. Francesca Liao-Fang
Associate Professor
Department of Neuroscience
University of Minnesota

Title: "Distinct roles of tau phosphorylation in two specific regions in multiple neurodegenerative diseases"

Mark Lewis, Ph.D. CANCELLED

March 14, 2017

Host: Dr. Byron Jones
Professor
Department of Psychiatry
University of Florida

Chin Chang, Ph.D. CANCELLED

March 21, 2017

Host: Dr. Victor Chizhikov
Professor
Department of Cell & Developmental Biology
Vanderbilt

Catherine Bowes Rickman, Ph.D.

April 4, 2017

Host: Dr. Monica Jablonski
Associate Professor
Department of Ophthalmology & Cell Biology
Duke School of Medicine

Title: "The Regulation of AMD-like Pathology by Complement Factor H"

Frank Longo, M.D., Ph.D.

April 11, 2017

Host: Dr. Joan Han
Professor
Department of Neurology & Neurosurgery
Stanford Medicine

Title: TBA

Volney Sheen, M.D., Ph.D.

April 18, 2017

Host: Dr. Jack Tsao
Assistant Professor
Department of Neurology
Director of Epilepsy, BIDN Campus
Harvard Medical School

Title: "Formin(g) the brain with filamins"

Nicholas Simon, Ph.D.

April 25, 2017

Host: Nick Saites
Assistant Professor
Department of Psychology
University of Memphis

Title: "Modeling Risky Decision-Making In Rodents: Implications For Addiction"

Laura Colgin, Ph.D.

May 2, 2017

Host: Dr. Detlef Heck
Assistant Professor
Department of Neuroscience

Center for Learning and Memory
University of Texas at Austin

Title: "Slow and fast gamma rhythms in the hippocampus"

Marina Guizzetti, Ph.D.

May 9, 2017

Host: Dr. Kristin Hamre
Associate Professor
Department of Behavioral Neuroscience
Oregon Health Science Center

Title: "Astrocyte-neuron interactions in Fetal Alcohol Spectrum Disorders"

Daniel Savage, Ph.D.

May 16, 2017

Host: Dr. Anna Bukiya and the Department of Pharmacology
PI and Center Director
Department of Neuroscience
University of New Mexico

Title: "Prenatal alcohol-induced learning deficits: From mechanisms to novel interventions"

APPENDIX 4
Neuroscience Research News, Events and Graduate Training Flyer
FY 2016-2017

MEMPHIS BUSINESS JOURNAL



Industries & Topics

News

Lists & Awards

People & Companies

Events

Kristen Hamre Recognition Plaque

Kristen Hamre

Date added: October 17, 2016

Submission Type: Professional Recognition

Current employer: University of Tennessee Health Science Center

Current title/position: Associate Professor, Department of Anatomy and Neurobiology

Industry: [Health Care](#)

Reason for being recognized: Dr. Hamre and Dr. Cynthia Kane, professors at the University of Arkansas for Medical Sciences (UAMS), have been named the 2016 winners of the UTHSC/UAMS USA Collaborative Research Network (CORNET) Award. The \$50,000 award is designed to promote new lines of team-based substance abuse research.

[See More People on the Move](#)



Dr. Alex Dopico of UTHSC Named to National Advisory Council on Alcohol Abuse and Alcoholism

Written by Peggy Reisser | December 6, 2016



After more than two decades researching the effects of alcohol on the brain, Dr. Alex Dopico has been invited to serve on the National Advisory Council on Alcohol Abuse and Alcoholism. (Photo by Thurman Hobson/UTHSC)

Alex Dopico, MD, PhD, of the University of Tennessee Health Science Center (UTHSC) has spent more than two decades researching the effects of alcohol on the brain. Nationally funded and well-regarded for his work, Dr. Dopico will now have an opportunity to make an impact on a national level on research and policy focusing on alcohol and alcoholism.

Dr. Dopico, University Distinguished Professor and chair of the Department of Pharmacology in the College of Medicine at UTHSC, has been appointed to serve a four-year term on the National Advisory Council on Alcohol Abuse and Alcoholism. The council is the highest advisory board for the National Institute on Alcohol Abuse and Alcoholism (NIAAA), one of the 27 institutes and centers that make up the National Institutes of Health (NIH).

NIAAA leads the country's effort to stem alcohol-related problems by conducting and supporting research; coordinating local, state and national programs; and disseminating information to the public. It is the world's largest funder of alcohol research.

The 18-member council advises, assists and consults with the Secretary of Health and Human Services and the director of the NIAAA on matters related to the activities and policies of the institute. Along with helping to shape policy nationwide, the council is charged with second-level review on grants for alcohol research before they become effectively funded.

Assistant Professor Rajashekhar Gangaraju of UTHSC Receives \$1.5 Million Grant to Develop Stem Cell Therapeutics for Retinal Injuries

Written by Amber Carter | December 7, 2016



Dr. Rajashekhar Gangaraju has been awarded a \$1.5 million grant from the United States Army Medical Research Acquisition Activity to develop stem cell-based therapeutics for retinal damage after traumatic brain injury. (Photo by Thurman Hobson/UTHSC)

Rajashekhar Gangaraju, PhD, an assistant professor in the Hamilton Eye Institute at the University of Tennessee Health Science Center (UTHSC), has been awarded a \$1.5 million grant from the United States Army Medical Research Acquisition Activity to develop stem cell-based therapeutics for retinal damage after traumatic brain injury, specifically in military personnel after blast injuries are sustained.

Blast causing traumatic brain injury (TBI) is also frequently associated with progressing vision problems that can result in blindness. Most knowledge about mild TBI in humans is based on sports injuries and motor vehicle accidents. Relatively less research has been performed on blast-induced brain injuries. The current methods of treatment for these visual deficits are, in any case, far from satisfactory and, in most cases, do not address the underlying neurodegeneration.

Dr. Gangaraju's laboratory pioneered the use of stem cells derived from human adipose tissue (ADSC), which is readily available and could potentially be useful as a therapeutic strategy in retinal diseases. It is known to secrete a variety of proteins that are neuroprotective. In this pre-clinical study, the researchers will explore if anti-inflammatory proteins released by ADSC have the ability to stop blast-related retinal damage and improve visual function.

Professor Jonathan H. Jaggar, PhD, of The University of Tennessee Health Science Center Awarded \$1.5 Million to Study Blood Pressure Regulation by Arterial Smooth Muscle Cell Ion Channels

Written by Sarah Ashley Fenderson | March 9, 2017



The National Institutes of Health has awarded Dr. Jonathan H. Jaggar \$1.5 million to study called ion channels that regulate blood pressure and flow in the body. (Photo by Thurman Hobson/UTHSC)

The National Institutes of Health (NIH) recently awarded Jonathan H. Jaggar, PhD, Maury Bronstein Endowed Professor in the Department of Physiology at the University of Tennessee Health Science Center (UTHSC), a \$1,520,000 grant for his project titled "Blood Pressure Regulation by Smooth Muscle Cell Ion Channels." The proposal is designed to study proteins called ion channels that regulate blood pressure and flow in the body.

Arteries contain smooth muscle cells, which regulate systemic blood pressure and blood flow within organs. Smooth muscle cells express several different ion channel proteins that regulate contractility, but physiological systemic blood pressure regulation by many of these proteins is unclear. Similarly, involvement of these proteins during high blood pressure (hypertension) is also poorly understood. A channel termed Transient Receptor Potential Polycystic (TRPP1) is present in arterial smooth muscle cells, but blood pressure regulation by this protein, signaling mechanisms involved, and the concept that targeting these proteins alleviates hypertension have not been studied. Dr. Jaggar will investigate the physiological and pathological significance of arterial smooth muscle cell TRPP1 channels to better understand blood pressure regulation and the potential to treat hypertension.

Investigator Lawrence T. Reiter, PhD, of The University of Tennessee Health Science Center Receives \$418,000 Grant for New Antiepileptic Drug Treatment Study

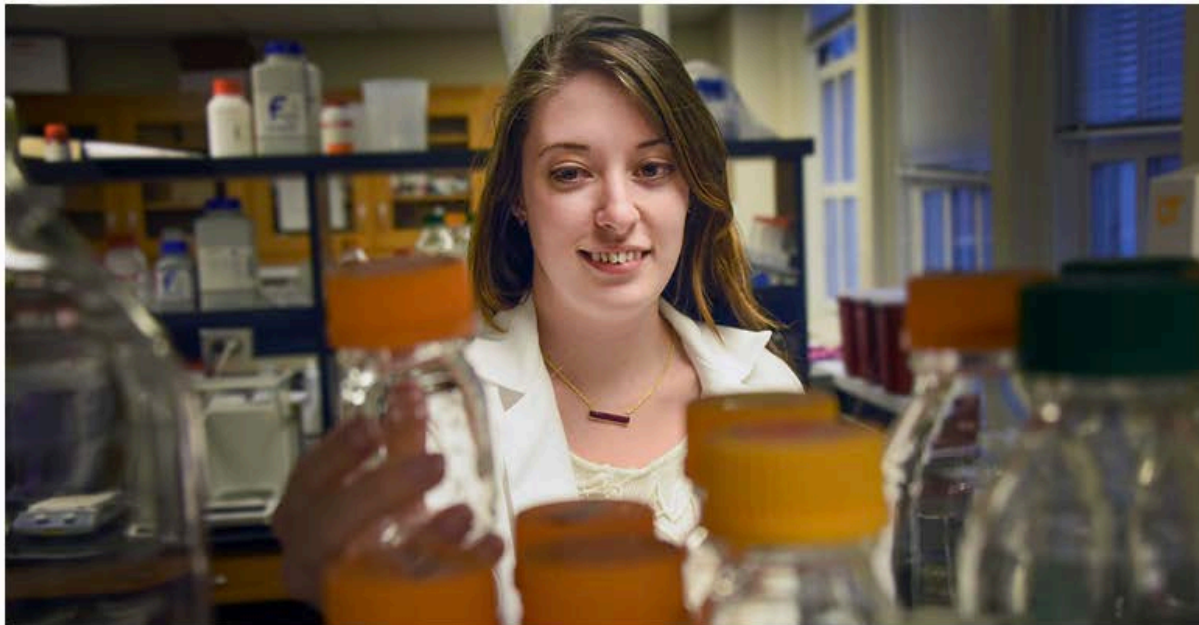
Written by Sarah Ashley Fenderson | May 25, 2017



Dr. Lawrence Reiter has received \$418,000 from the National Institutes of Health to identify currently approved medications that can potentially be repurposed for antiepileptics in both 15q Duplication syndrome and inherited epilepsy. (Photo provided by Reiter Lab)

Graduate Student Jordan Ross of The University of Tennessee Health Science Center Receives NIH Fellowship to Study Fear Learning Mechanisms in Brain

Written by Sarah Ashley Fenderson | June 26, 2017



Jordan Ross will investigate the underlying mechanisms of sensory processing and plasticity, or changes, as they relate to fear learning in the olfactory bulb which is the first site of odor processing in the brain.

The University of Tennessee Health Science Center announced today that Jordan Ross, graduate student in the Department of Anatomy and Neurobiology in the College of Medicine, is the recipient of a National Institutes of Health Fellowship. Ross will investigate the underlying mechanisms of sensory processing and plasticity, or changes, as they relate to fear learning in the olfactory bulb which is the first site of odor processing in the brain.

Associative fear learning, a fundamental cause of disorders such as Post-Traumatic Stress Disorder (PTSD), involves the pairing of a stimulus with a negative outcome. This combination causes robust fear responses to the conditioned stimulus. Upon detecting a smell, the olfactory neurons in the upper part of the nose create an impulse which is passed to the brain along the olfactory nerve. This information is transmitted to the olfactory bulb first, which processes the signal and then passes information about the smell to other areas closely connected to it, including parts of the limbic system.

Odor-evoked memories, such as those formed during olfactory fear learning, are attained quickly, are long-lasting, and are apparent in olfactory bulb glomeruli, the initial sites of odor processing in the brain. Ross's investigation aims to understand how a learning event can change the way the brain processes sensory stimuli in the early stages of sensory information coming into the brain.

Research Duo from The University of Tennessee Health Science Center Awarded \$1.9 Million to Develop Novel Web-based Analysis Platform for Precision Medicine

Written by Sarah Ashley Fenderson | June 28, 2017

The National Institutes of Health (NIH) recently awarded Robert W. Williams, PhD, chair of the Department of Genetics, Genomics and Informatics, and Saunak Sen, PhD, professor and chief of Biostatistics in the Department of Preventive Medicine at the University of Tennessee Health Science Center (UTHSC), a \$1,920,056 grant for their project titled, "A Unified High Performance Web Service for Systems Genetics and Precision Medicine."

The proposal is funding the development of a high-performance database and open source software for web-based genetics. The project, called GeneNetwork, will provide researchers with data access and a sophisticated set of online tools used to study genetic differences and to evaluate disease risk in model organisms and human cohorts.

GeneNetwork was launched in 2001 as part of a NIH Human Brain Project grant to UTHSC, and was one of the first websites designed for gene mapping. This new NIH grant supports major upgrades for the software infrastructure for gene mapping and analysis. The system is open source, and both the code and data is available to users. The system enables direct access to experimental data and statistical analysis tools to a wide range of users— from students and teachers to research scientists.

"Our goal has been to develop methods to analyze and integrate massive omics data sets with data on disease risks, all in the context of predictive modeling and more targeted or personalized treatment," Dr. Williams said. "In the long run, the goal is to enable researchers and even clinicians working in predictive medicine to identify appropriate therapeutics, drugs, lifestyles, etc. for patients."



Principal Investigators Dr. Robert W. Williams and Dr. Saunak Sen, (front row L to R, seats 3 and 4), have received an NIH award to fund the development of a high-performance database and open source software for web-based genetics. (Photo by Rob Williams/UTHSC)

Mozhui Awarded \$418,000 Grant to Study Epigenetics of Aging

Written by Amber Carter | October 17, 2017

Khyobeni Mozhui, PhD, an assistant professor in the Departments of Preventive Medicine and Genetics, Genomics and Informatics in the College of Medicine at the University of Tennessee Health Science Center (UTHSC), has received a \$418,000 grant from the National Institutes of Health to study the epigenetics of aging. The two-year award will support the project, titled "DNA Methylation and Gene Expression Study of Aging and Lifespan Differences."

Dr. Mozhui is collaborating with UTHSC's Megan Mulligan, PhD, and Karolina Aberg, PhD, from Virginia Commonwealth University on this research study. Their team will use the vast biobanked tissue resource developed by Robert Williams, PhD, professor and chair of the Department of Genetics, Genomics and Informatics at UTHSC.

With this project, Dr. Mozhui and her team aim to gain a more comprehensive understanding of the molecular basis of aging. If successful, this project could better strategies for healthy aging, and for enhancing vigor and wellness during old age.

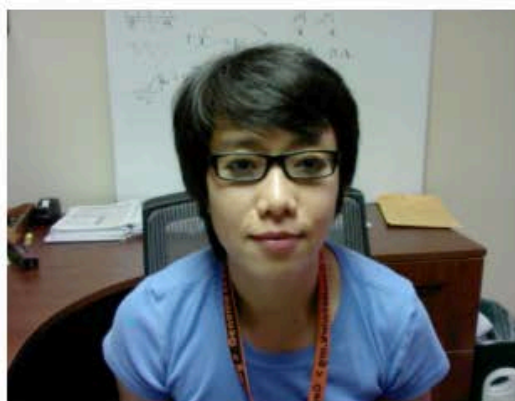
"Aging can be thought of as a form of scheduled self-destruction that ensures timely demise of an individual," Dr.

Mozhui said. "For now, we don't have a comprehensive explanation as to why multi-cellular organisms like us have a predefined period of viability before the cellular degeneration and aging process."

Aging in a complex biological process that results in increased vulnerability to numerous diseases and loss of health and vigor. There is no definite answer as to why living organisms age. While human life expectancy has increased, this increase in lifespan is not necessarily accompanied by an increase in "health span" and the burden of disease is very high among the elderly.

An important aspect of aging is the epigenetic modifications that occur on the DNA. In particular, the research will focus on DNA methylation, an epigenetic modification that is considered to be a biomarker of biological age and possibly predictive of health and life expectancy.

"Work in my lab has shown that specific DNA methylation changes that occur during aging are highly conserved and consistent in both mice and humans and could represent a fundamental feature of molecular aging in mammals," Dr. Mozhui said. "The present study will evaluate the time dynamics in DNA methylation and gene expression, and examine whether these changes are associated with lifespan and aging rate. Ultimately, our goal is not so much to delay or reverse aging, but to understand how we can maintain optimal health as we advance in age."



Dr. Mozhui will use her new NIH grant to study the epigenetics of aging (Photo provided by Khyobeni Mozhui)

\$1.3 Million Granted to Helena Parfenova, PhD, to Study Damaging Seizure-Activated Mechanisms in Newborn Brains

Written by Sarah Ashley Fenderson | August 8, 2017



Dr. Helena Parfenova has received \$1.3 million to study the underlying mechanisms and functional consequences of seizure-related injuries in the neonatal brain. (Photo provided by Communications and Marketing/UTHSC)

The University of Tennessee Health Science Center's Helena Parfenova, PhD, professor in the Department of Physiology in the College of Medicine, was recently granted a \$1.3 million from the National Institutes of Health. Dr. Parfenova is studying the underlying mechanisms and functional consequences of glial cell, or astrocyte, injury caused by seizures in the neonatal brain.

UTHSC's Detlef Heck Participates in Unique Program Merging Science and Spirituality

Written by Peggy Reisser | October 9, 2017



Detlef Heck, PhD, left front, had the opportunity to spend time in India as part of a program through Emory University designed to teach science to Buddhist monks living in a monastery outside Bangalore. (Photos courtesy of Dr. Heck)

Detlef Heck, PhD, an associate professor at the University of Tennessee Health Science Center, recently got the opportunity to participate in a unique mix of science and spirituality in a classroom more than 8,000 miles away from his home campus.

As a faculty member of the Department of Anatomy and Neurobiology at UTHSC, he is used to teaching the science of the brain. This time, however, his students were Tibetan Buddhist monks living at the Sera Monastery south of Bangalore, India.

Dr. Heck traveled to India with [Emory University's Robert A. Paul Emory-Tibet Science Initiative](#). The innovative educational program aims to teach modern science to the monks. It began in 2006 when the Dalai Lama invited Emory to collaborate with the Library of Tibetan Works and Archives.



Student Nick Saites Honored for Exceptional Community Service

Written by Amber Carter | April 28, 2016



Louis "Nick" Saites (right) recently received the 2016 Harold Love Award for Community Service. He is pictured with Evan Cope, chair of the Tennessee Higher Education Commission (left), and Russ Deaton, interim executive director of the Tennessee Higher Education Commission.

For as long as he can remember, UTHSC student Louis "Nick" Saites has had a love for science, research and public service. Now, he is in a position that marries all three, and he's being honored for pursuing those passions.

Involved in many service-oriented organizations, Saites was recently awarded the 2016 Harold Love Award for Community Service. The award, named for the late Tennessee Representative Harold Love, recognizes momentous public service by faculty, staff and students in higher education. Nominated by fellow student and president of the Graduate Student Executive Council (GSEC) Jason Workman, Saites received a \$1,000 cash prize and recognition during an award ceremony April 21 at the

Tennessee Higher Education Commission offices in Nashville.

A native of Lewisburg, Tennessee, he is working as a researcher in the College of Graduate Health Sciences. As a fourth-year student on the neuroscience track, Saites is studying how the sense of taste influences feeding behavior via signal processing throughout the brain's reward system. He hopes to provide translational medicine in the field of psychiatry, helping people understand and overcome addictive behaviors. "In many ways, my current job and volunteering activities are laying the groundwork for me to pursue my true passion," he said.

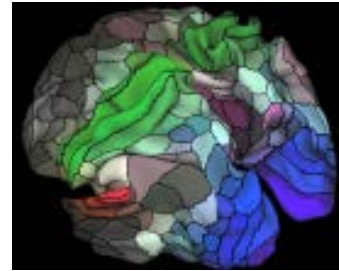
One of Saites' community affiliations includes **SMART Recovery** (Self-Management and Recovery Training), an organization founded to help people overcome addictive behaviors. He is involved with the facilitation of several of these meetings in Memphis. He also presented on the advantages of including SMART Recovery to TN Lifeline, a state-funded initiative to increase support for group meetings and lower stigma associated with addiction.

Saites founded the Memphis Comprehensive Recovery Network, which supports the facilitators of recovery groups.

At UTHSC, Saites is active with the Graduate Student Executive Council and currently serves as the co-chair of community outreach for the Interprofessional Student Council.

Brain Awareness Day

Saturday October 1, 2016
9:00 AM – 1:00 PM



Title: Drugs Change the Brain, But Not in a Good Way

Location: 8 South Dunlap St., General Education Building
University of Tennessee Health Science Center

The Drug Ecstasy Damages the Brain

Dr. Ronald L. Cowan, M.D., Ph.D.

Professor of Psychiatry; Vice Chair for Education; Director, Residency Training Program;
Director, Psychiatric Neuroimaging Program. Department of Psychiatry and Behavioral Sciences.
Vanderbilt University School of Medicine

Long Term Effects of Adolescent Marijuana Use Evaluated in an Animal Model

Dr. Mary M. Torregrossa, Ph.D.

Assistant Professor of Psychiatry, University of Pittsburgh

Social Learning Promotes Nicotine Intake

Dr. Hao Chen, Ph.D.

Assistant Professor of Pharmacology, University of Tennessee Health Science Center

Hands-on activities for students.
Free parking. Lunch will be provided.
Continued education credits available.
RSVP at <http://whoozin.com/brain>

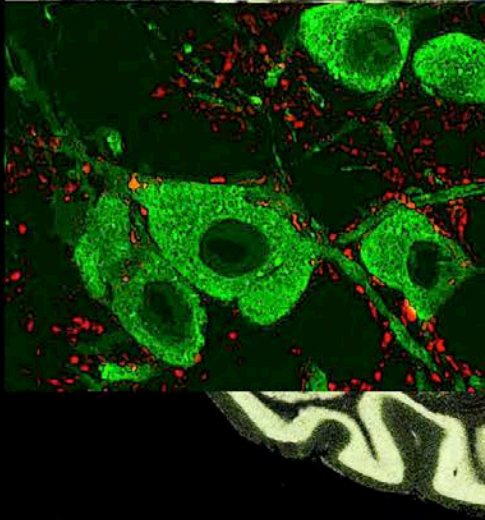
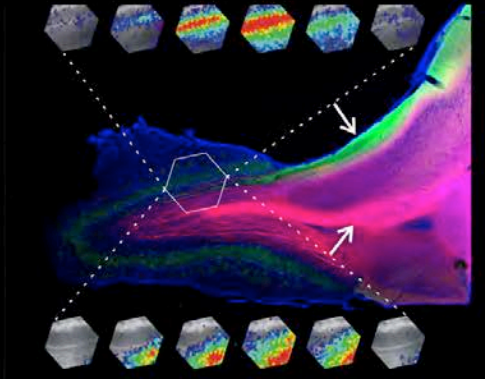
Organizers: Drs. William Armstrong, A. Reiner, H. Chen.
The Neuroscience Institute, UTHSC

Sponsored by: The National Institute on Drug Abuse,
Center for GWAS in Outbred Rats.





Graduate Studies in Neuroscience



The Neuroscience Graduate Program is a multidisciplinary, interdepartmental Ph.D. program at the University of Tennessee Health Science Center (UTHSC) and supported by the Neuroscience Institute. Established in 1985, the Neuroscience Institute comprises over 90 faculty from multiple departments and colleges, including Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pediatrics, Pharmaceutical Sciences, Pharmacology, Physiology, and Surgery. Some faculty hold primary appointments at the world-renowned St. Jude Children's Research Hospital (SJCRRH) a short distance away. Our program provides broad training in neurophysiology, neuropharmacology, neuroanatomy, molecular and cellular neuroscience, developmental neurobiology, and behavioral neuroscience.

Basic and clinical Neuroscience research at UTHSC focus on intracellular signaling pathways, neuronal excitability, synaptic transmission, sensory processing and retinal biology, neurological and neurodegenerative disorders, brain tumors, neurogenetics and neural development, and mental and addictive disorders. UTHSC is one of the world's leading centers exploiting novel genetic approaches to explore brain development, function and behavior, and psychiatric and neurodegenerative diseases. Neuroscientists at SJCRRH are studying diverse pediatric tumors and diseases in the CNS using cutting-edge molecular, genomic and genetic methods.

Memphis is a culturally diverse metropolitan area of over 2.5 million residents, with the rich traditions of a city on the banks of the Mississippi River. Memphis has more sunny days than Miami, and combines southern heritage and hospitality with contemporary charm. You'll enjoy great dining (world famous barbecue), art galleries and an exciting nightlife. Memphis is a must for those wanting to visit the birthplace of blues, soul, and rock and roll. Sun Studio, The Rock 'N' Soul Museum, Gibson Guitar Factory and Beale Street entertainment district are just a few blocks from campus, as is the Mississippi River, and downtown. The city is runner and bike-friendly, with a new "greenline" extending to the city center from a 3200 acre urban park (Shelby Farms) that also provides fishing and horseback riding. Memphis is home to FedEx, to the NBA's Memphis Grizzlies, and to the Memphis Zoo, ranked one of the top zoos in the US and home to over 3500 animals on 76 beautifully landscaped acres.

To apply to the Neuroscience Track of our Graduate Program, please go to the Integrated Biomedical Science Program website:
<http://www.uthsc.edu/grad/IBS>

To find out more about Neuroscience and our program, please visit our website:
<http://www.uthsc.edu/neuroscience>

