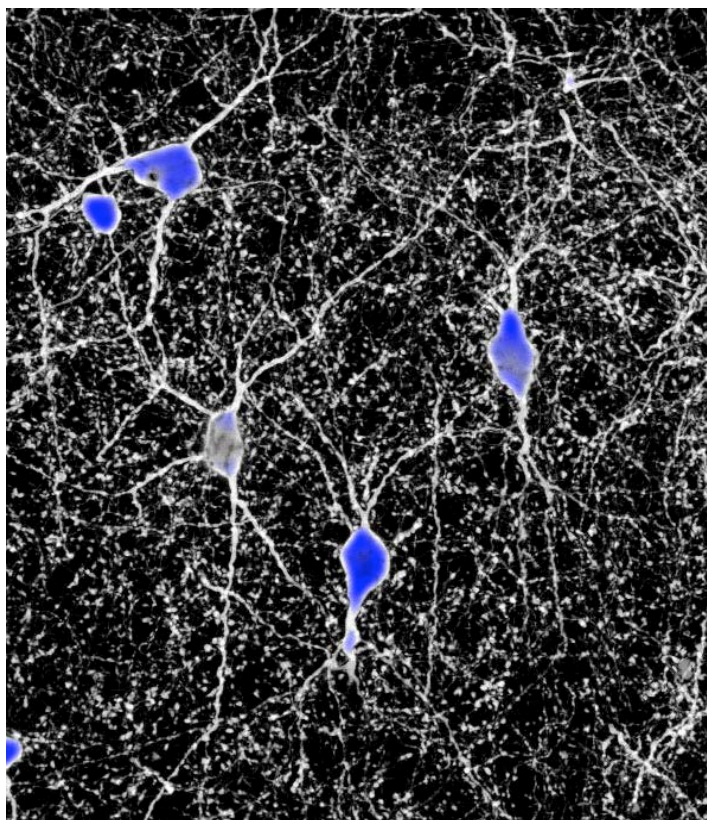




THE
NEUROSCIENCE INSTITUTE

UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

Neuroscience Center of Excellence



Annual Report to the
Tennessee Higher Education Commission
Fiscal year 2007-2008

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I. ADMINISTRATIVE STRUCTURE

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

Co-Director: Professor Tony Reiner, Ph.D.
Department of Anatomy and Neurobiology

Administrator: Brenda Smith

IT Specialist: Brandy Fleming

Business Manager: *Jeff Jones/Charlotte Hilliard

Neuroscience Executive Committee:

Eldon Geisert, Ph.D., Professor and Director, Center for Vision Research, Department of Ophthalmology

***Dan Goldowitz*, Ph.D., Methodist Professor, Department of Anatomy and Neurobiology

Mark LeDoux, M.D., Ph.D., Professor, Department of Neurology

Charles Leffler, Ph.D., Professor, Department of Physiology

William A. Pulsinelli, M.D., Ph.D., Semmes-Murphey Professor and Chair, Department of Neurology

Tony Reiner, Ph.D., Professor and NI Co-Director, Department of Anatomy and Neurobiology

Susan E. Senogles, Ph.D., Associate Professor, Department of Molecular Sciences

Burt Sharp, M.D., Van Vleet Professor and Chair, Department of Pharmacology

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

**Jeff Jones moved to the University of Florida in May 2008 and was replaced by Ms. Hilliard as interim business manager. Ms. Hilliard will be replaced by a permanent business manager this FY.*

***Dr. Goldowitz moved to the University of British Columbia mid-year.*

Center Address:

University of Tennessee Health Science Center

875 Monroe Ave., Suite 422, Wittenborg Building

Memphis TN 38163

(901) 448-5956

Organizational Structure:

The Neuroscience Center of Excellence comprises the administrative core and financial engine of the University of Tennessee Health Science Center's Neuroscience Institute (NI), which is located within the University of Tennessee College of Medicine at the UT Health Science Center (UTHSC) in Memphis. Prof. William E. Armstrong is the Director, and Prof. Tony Reiner is the Co-Director. The Director answers to the Executive Dean of the College of Medicine, Steven J. Schwab, M.D. Physically the NI is housed within twelve different departments in the College of Medicine and some other UT departments, with a separate administrative suite in 422 Wittenborg Building at UTHSC. Affiliated members reside at UT Knoxville, St. Jude Children's Hospital, and at the University of Memphis. The NI staff includes shared clerical and accounting personnel (Ms. Brenda Smith and Mr. Jeff Jones/Ms. Hilliard, respectively), a full-time IT specialist (Brandy Fleming) and a Full Time Technical Director of the Neuroscience Imaging Core (Kathy Troughton).

In FY 2007-2008, the NI/Center of Excellence adopted a Cost Center independent of the department of Anatomy and Neurobiology (A & N) in order to facilitate interdepartmental activities worthy of a college-wide Center. This change will further involve acquiring independent clerical and accounting personnel this FY. Since Ms. Brenda also serves as the Administrative Assistant to the chair of Anatomy and Neurobiology and the NI is no longer under the A and N cost center, the duties of Ms. Smith will be assumed by a new assistant, to be named in 2008. In addition, IT specialist Brandy Fleming will assume the effective duties of Business Manager in 2008-2009.

II. BUDGET (see details, page 5)

A. 2007-08. The FY 2007-08 appropriated budget for the UTNI was \$672,300. We carried forward \$317,704 from the previous year for a total budget of \$990,004. This substantial carryover reflected that UTHSC College of Graduate Health Sciences picked up the majority of all graduate student stipends, some of which would have been picked up previously by NI. This carryover was used primarily to fund Pilot Research projects that commenced in Feb. of 2008 and which will be continued in 2008-2009, with the possibility for 1-year renewals in 2009-2010. This past FY, we expended \$347,671 in total personnel costs, which included 1 full graduate student stipend and partial support for 5 postdoctoral/research associates. Personnel costs include administrative supplements for the Director and Co-Director, supplements for clerical support (shared with Anatomy and Neurobiology), a full-time IT specialist, full time Technical Director of Imaging Facility, and an administrative supplement to the Director of Confocal Microscopy within the Imaging Center. Finally, the NI partnered with COM and the Department of Neurology toward the hire of Dr. Mike MacDonald. NI will pay

~25% of Dr. MacDonald's salary over another 3 years.

Neuroscience Imaging Center: We contributed \$~20,000 to the installation of a shared Solamere Systems Spinning Disk Confocal microscope awarded to NI member Jon Jaggar by the NIH. Many NI members were Major Users in this application. We also invested another \$22,785 upgrading the popular Neurolucida workstation in the NI Imaging Center to include a software package for unbiased stereological measurements, a new high-resolution digital camera, and a new computer for the workstation.

Start-up funds: Four new tenure-track neuroscientists recruited into the Department of A & N in 2002-2003, and a total of \$500,000 was used toward startup funds for these investigators. There still remains a continuing startup obligation to these investigators of \$44,000; all of this will be spent in the coming year.

Seminars and Symposia: Additional funds went to support travel (\$18,436) and honoraria (\$3,900) for Neuroscience Seminar series, the Brain Awareness Symposium in collaboration with the Urban Child Institute, two Translational Neuroscience Symposia, and one Public Neuroscience Lecture (**see Appendix 4**).

Bridge Funds: The pay line at the National Institute of Neurological Disease and Stroke (NINDS), where many NI members receive grants, is ~10%! We contributed \$61,806 to bridge funding for three NI faculty members for FYI 2007-2008. These funds were used largely for personnel in the labs (so are included in "Other Professional" in Schedule 7), and for supplies (included in "Other Supplies"). We are happy to report that **each of the scientists achieved funding for FY 2008-2009** (1 in Pharmacology, 2 in A & N), and will not need further support. The NI bridge funds were supplemented by funds from A & N for the two A and Faculty, and by the bridge funds from the Vice Chancellor for Research at UTHSC. Should the need arise, NI is open to assistance for NI members that typically have been funded should funds be available- but resources for the next 2 years are largely committed to pilot research grants.

Pilot Projects: NI spent \$221,905 in Pilot Research projects in 2007-2008, and in support of the Neurotrauma Center at UTHSC. These are detailed under **Goal 3** under Item **X** below.

B. 2008-2009. Because the College of Graduate Health Sciences has agreed to pay all 1st and 2nd year stipends for students in the Integrated Program in Biomedical Sciences, we were not obligated to as many funds to incoming graduate students this past year. We will carryover \$330,867 to the coming fiscal year, and have been appropriated \$644,400 (a cut from \$672,300 in 07-08), for a total of \$975,267. The majority of the carryover is already committed to Pilot Research projects and personnel. Here is a breakdown of the major anticipated projects:

Students: In the coming year, we will offer matching funds for graduate stipends to PIs with graduate students on a competitive basis, and will fund the full stipend of one minority student. We have reserved \$100,000 for graduate stipends, instead of the previously committed \$200,000.

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Seminar Series and Community Outreach: We will continue to fund the weekly Neuroscience Seminar series and will also sponsor more Translational Neuroscience Symposia in the course of the academic year, where clinical and basic scientists present complementary research on any of the 3 focus areas. We will continue to work with the Urban Child Institute to fund community outreach activities such as Brain Awareness Week. We will also continue to fund the summer Undergraduate Neuroscience Merit Fellowships to Rhodes and Christian Brothers University students who are doing research projects in Neuroscience towards fulfilling their degree requirements.

Neuroscience Imaging Center: We plan to invest \$30,000 upgrading the confocal workstation in the Neuroscience Imaging Center to include a package for serial reconstructions, deconvolution, and volumetric measurements from confocal stacks, requested by several NI members.

New NI Faculty: We will commit another 3 years of partial salary support to Dr. Mike McDonald (\$90,000 over 4 years) in the Department of Neurology. Dr. McDonald is a behavioral Neuroscientist, specializing in genetic models of Alzheimer's disease. His presence is critical to the further development of translational neuroscience at UTHSC. He has just finished his first year of NI support.

Pilot Projects: The NI will commit \$237,933 to support pilot research projects aimed at developing research grant applications during the next FY. The projects represent collaborative efforts among NI members across disciplines and departments. The details of these projects can be found under **Goal 3, item X below**.

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Schedule 7

CENTERS OF EXCELLENCE/CENTERS OF EMPHASIS
ACTUAL, PROPOSED, AND REQUESTED BUDGET

Institution UT Health Science Center Center Neuroscience

	FY 2007-08 Actual			FY 2008-09 Proposed			FY 2009-10 Requested		
	Matching	Appopr.	Total	Matching	Appopr.	Total	Matching	Appopr.	Total
Expenditures			0			0			0
Salaries									
Faculty	585,906	95,032	680,938	493,675	157,610	651,285	518,359	165,491	683,849
Other Professional		130,513	130,513		108,956	108,956	0	114,403	114,403
Clerical/ Supporting	36,763	16,620	53,383		15,000	15,000	0	15,750	15,750
Assistantships		21,360	21,360		100,000	100,000	0	100,000	100,000
Total Salaries	622,669	263,525	886,194	493,675	381,566	875,241	518,359	395,644	914,003
Longevity		3,919	3,919		4,000	4,000		4,200	4,200
Fringe Benefits	30,452	80,227	110,679	35,189	75,561	110,750	36,948	79,339	116,288
Total Personnel	653,121	347,671	1,000,792	528,864	461,127	989,991	555,307	479,183	1,034,490
Non-Personnel									
Travel		18,436	18,436		25,000	25,000	0	26,250	26,250
Software			0		30,000	30,000	0	0	0
Books & Journals			0			0	0	0	0
Other Supplies		81,153	81,153		79,207	79,207	0	104,167	104,167
Equipment	229,690	40,323	270,013		20,000	20,000	0	36,320	36,320
Maintenance		27,289	27,289		40,000	40,000	0	42,000	42,000
Scholarships		11,250	11,250		8,000	8,000	0	16,000	16,000
Consultants		3,900	3,900		4,000	4,000	0	4,200	4,200
Renovation			0			0	0	0	0
Other (Specify)			0			0	0	0	0
Pilot Projects Imaging Center Recovery	67,171	154,734	221,905	157,933	237,933	395,866	100,000	100,000	200,000
		-28,074	-28,074		-30,000	-30,000	0	-31,500	-31,500
Total Non-Personnel	296,861	309,011	605,872	157,933	414,140	572,073	100,000	297,437	397,437
GRAND TOTAL	949,981	656,682	1,606,663	686,797	875,267	1,562,063	655,307	776,620	1,431,927
Revenue									
New State Appropriation		672,300	672,300		644,400	644,400		676,620	676,620
Carryover State Appropriation		317,704	317,704		330,867	330,867		100,000	100,000
New Matching Funds Carryover from Previous Matching Funds	949,981		949,981	686,797		686,797	655,307		655,307
			0			0			0
Total Revenue	949,981	990,004	1,939,985	686,797	975,267	1,662,064	655,307	776,620	1,431,927

III. EXTRAMURAL FUNDING OF NEUROSCIENCE FACULTY

The UT Neuroscience Institute remains one of the largest concentrated Neuroscience programs in the country and has achieved an international reputation as a preeminent center for Neuroscience in the United States. For FY05 (the last year of NIH rankings available), the core department, Anatomy and Neurobiology, was ranked 23rd among all U.S. medical school departments of Anatomy and/or Cell Biology in NIH grant awards. Although not ranked with Departments of Neuroscience, the UTHSC Department of Anatomy and Neurobiology would be ranked *12th* in a listing of Neuroscience Departments, just behind the University of Florida (all but one active researcher in A & N are Neuroscientists and NI members). *The total annual grant dollars (direct costs) currently held by faculty (of all departments, including those at affiliates such as St. Jude and Univ. of Memphis) associated with the UTNI is \$19,428,808. Given an investment by the State of Tennessee of ~\$13.7 million over the past 23 years, Neuroscience faculty have generated approximately \$262.5 million in external grant funds (direct costs only, largely from NIH). The additional indirect costs add significantly to that amount.*

The research grants (annual direct costs) currently held by individual faculty of the UTNI are listed by Principal Investigator in **Appendix 1**.

IV. HISTORY OF THE NEUROSCIENCE INSTITUTE

Recognizing the importance of the multidisciplinary nature of the brain sciences, leaders at UTHSC created an interdisciplinary program in Neuroscience in 1985. The program currently brings together over ninety neuroscience faculty members holding appointments in the Departments of Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pediatrics, Pharmaceutical Sciences, Pharmacology, Physiology, Psychiatry, and Surgery, and in the Department of Biochemistry and Cellular and Molecular Biology at the University of Tennessee, Knoxville. Strong affiliations are present with Methodist University Hospital, Le Bonheur Children's Hospital, St. Jude's Children Hospital, the University of Memphis, Rhodes College and Christian Brother's University. The interdepartmental nature of the program and the collaborations fostered through the program provide the cross-disciplinary environment necessary for high quality neuroscience research, training and patient care.

In recognition of this quality, the State of Tennessee established the Neuroscience Center of Excellence at UTHSC in 1985, which was designated as an Accomplished Center of Excellence by the Tennessee Higher Education Commission in 1988. In 1998, Chancellor William R. Rice designated the Neuroscience Center of Excellence as the University of Tennessee Neuroscience Institute, with dedicated space in the Wittenborg, Link and Johnson buildings. The Neuroscience Center of Excellence award provides funds 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, a weekly seminar series, and for community outreach programs such those associated with Brain Awareness Week. The Director from inception until June of 2002 was Dr. Steven T. Kitai.

In June of 2002, Dr. David V. Smith was recruited from the University of Maryland to serve as Chairman of the Department of Anatomy and Neurobiology and Director of UTNI. Dr. Smith appointed a new Executive Committee to help direct UTNI activities in 2002. In Dec. of 2005, Dr. Smith became ill with a brain tumor, and the Co-Director, Dr. William Armstrong, became acting Director. Dr. Armstrong has been Director of the Institute since Dr. Smith's death in September of 2006.

In spring of 2006 the Executive Committee expanded to include clinical neuroscientists like Drs. Mark LeDoux and Jim Wheless, and additional basic science leaders on campus, such as Molecular Resource Center director Dan Goldowitz, and Professor of Physiology Charles Leffler. This year, Dr. Goldowitz departed in Nov. of 2007; his replacement is Dr. Tony Reiner, a professor in A & N. Dr. Reiner was subsequently named NI Co-Director. In 2006, the faculty-organized research groups assembled in 2002 were expanded to include 3 new Translational Neuroscience Focus Groups (described below). The NI participates in graduate education, providing student stipends for the Neuroscience Track of the Integrated Program in Biomedical Sciences, and contributing faculty to teach the Neuroscience block of the Systems Biology introductory course for that program. NI members serve as course instructors for 4 core Neuroscience Track graduate courses: Functional Neuroanatomy, Cellular Neuroscience, Developmental Neuroscience, and Behavioral Neuroscience. This fiscal year, three new faculty were added to the NI (see below).

V. FACULTY OF THE NEUROSCIENCE INSTITUTE

The Neuroscience Institute is currently comprised of 95 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. Faculty are listed with each department; those with primary appointments outside UTHSC or UTK are so indicated. Faculty shown in *bold italics* were recruited to the Institute in FY 2007-08.

Department of Anatomy and Neurobiology

William E. Armstrong, Ph.D., Professor and Director

John D. Boughter, Jr., Ph.D. Assistant Professor

Joseph C. Callaway, Ph.D., Associate Professor

Angela Cantrell, Ph.D., Assistant Professor

Elissa Chesler, Ph.D., Assistant Professor (Affiliate, Oak Ridge National Labs)

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Alessandra d'Azzo, Ph.D., Affiliated Professor (St. Jude)

Hong Wei Dong, Ph.D., Assistant Professor

Michael A. Dyer, Ph.D., Affiliated Assistant Professor (St. Jude)

Andrea J. Elberger, Ph.D., Professor

Matthew Ennis, Ph.D., Professor

Malinda E. C. Fitzgerald, Ph.D., Adjunct Professor (Christian Brothers Univ.)

Robert C. Foehring, Ph.D., Professor

Daniel Goldowitz, Ph.D., Methodist Professor and Director of Molecular Resource Center

Kristin Hamre, Ph.D., Assistant Professor

Detlef Heck, Ph.D., Assistant Professor

Paul Herron, Ph.D., Associate Professor

Marcia G. Honig, Ph.D., Professor

Eldridge F. Johnson, Ph.D., Professor

Hitoshi Kita, Ph.D., Professor

Christian H. Lemon, Ph.D., Assistant Professor

Cheng-Xiang Li, M.D., Assistant Professor

Lu Lu, Ph.D., Assistant Professor

Peter J. McKinnon, Ph.D., Affiliated Assistant Professor (St. Jude)

Guy Mittleman, Ph.D., Adjunct Associate Professor (Univ. Memphis)

James I. Morgan, Ph.D., Affiliated Professor (St. Jude)

Randall J. Nelson, Ph.D., Professor

Guillermo Oliver, Ph.D., Affiliated Associate Professor (St. Jude)

Melburn R. Park, Ph.D., Associate Professor

Anton J. Reiner, Ph.D., Professor and NI Co-Director

Thomas Schikorski, Ph.D., Assistant Professor

Reese S. Scroggs, Ph.D., Associate Professor

Richard J. Smeyne, Ph.D., Affiliated Associate Professor (St. Jude)

Douglas J. Swanson, Ph.D., Assistant Professor

Ryoichi Teruyama, Ph.D., Assistant Professor

Yiai Tong, Ph.D., Assistant Professor

Robert S. Waters, Ph.D., Professor

Robert W. Williams, Ph.D., Dunavent Professor

Yi-Hong Zhang, Ph.D., Assistant Professor

Jian Zuo, Ph.D., Affiliated Assistant Professor (St. Jude)

Department of Biochemistry and Cellular and Molecular Biology, UT Knoxville

Rebecca A. Prosser, Ph.D., Associate Professor

Department of Medicine

Tai-June Yoo, M.D., Ph.D., Professor

Department of Molecular Sciences

Mary K. Dahmer, Ph.D., Associate Professor

Susan E. Senogles, Ph.D., Associate Professor

Department of Neurology

Dominic M. Desiderio, Ph.D., Professor

Michael Jacewicz, M.D., Professor

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

Michael C. Levin, M.D., Associate Professor

Michael McDonald, Ph.D., Assistant Professor

Thaddeus S. Nowak, Ph.D., Professor

Ronald F. Pfeiffer, M.D., Professor

William A. Pulsinelli, M.D., Ph.D., Semmes-Murphey Professor and Chairman

Lawrence T. Reiter, Ph.D., Assistant Professor

Department of Neurosurgery

Frederick Boop, M.D., Associate Professor

Christopher Duntsch, M.D., Ph.D., Instructor

James T. Robertson, M.D., Professor

Jon H. Robertson, M.D., Robertson Professor and Chairman

Alan Sills, M.D., Associate Professor

Jeff Sorenson, M.D., Assistant Professor

Shelly Timmons, M.D., Associate Professor

Zixiu Xiang, Ph.D., Assistant Professor

Qihong Zhou, M.D., Ph.D., Instructor

Department of Ophthalmology

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

Eldon E. Geisert, Ph.D., Professor

Allesandro Iannoccone, M.D., Assistant Professor

Monica M. Jablonski, Ph.D., Associate Professor

Tonia S. Rex, Ph.D., Assistant Professor

Jena Steinle, Ph.D., Assistant Professor

Dianna A. Johnson, Ph.D., Hiatt Professor

Department of Pathology

F. Curtis Dohan, Jr., M.D., Associate Professor

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

Vicki Brewer, Ph.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Dave Clark, M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Kathryn MacVicar, M.D., Assistant Professor, Pediatric Neurology

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

Freedom F. Perkins, Jr., M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Massroor Pourcyrous, M.D., Professor, Pediatrics

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

Department of Pharmacy

Collin Hovinga, Pharm.D., Assistant Professor

Department of Pharmacology

Suleiman W. Bahouth, Ph.D., Associate Professor
Alex M. Dopico, M.D., Ph.D., Associate Professor
Kafait U. Malik, Ph.D., Professor
Shannon G. Matta, Ph.D., Professor
Burt Sharp, M.D., Van Vleet Professor and Chairman
Jeffery Steketee, Ph.D., Associate Professor
Steven J. Tavalin, Ph.D., Associate Professor
Fu-Ming Zhou, M.D., Ph.D., Assistant Professor

Department of Physiology

Clark M. Blatteis, Ph.D., Professor
Ioannis Dragatsis, Ph.D., Assistant Professor
Jonathan Jaggar, Associate Professor
Charles W. Leffler, Ph.D., Professor
Helena Parfevona, Ph.D., Professor
Mitchell A. Watsky, Ph.D., Associate Professor

Department of Psychiatry

Arthur M. Freeman, III, M.D., Professor
Ronald J. Bradley, Ph.D., Professor

Department of Surgery

Syamal Bhattacharya, Ph.D., Professor

University of Memphis

Ramin Homayouni, Ph.D., Assistant Professor
Guy Mittleman, Ph.D., Professor

St. Jude Children's Hospital

Michael Dyer, Ph.D., Associate Professor

Alessandra D'Azzo, Professor

Peter McKinnon, Ph.D., Associate Professor

James Morgan, Ph.D., Professor

Guillermo Oliver, Ph.D., Assistant Professor

Richard Smeyne, Ph.D., Associate Professor

Stanislav Zakharenko, Ph.D., Assistant Professor

Jian Zuo, Ph.D., Associate Professor

VI. AREAS OF NEUROSCIENCE RESEARCH

The research programs of the faculty of The Neuroscience Institute are diverse, representing most areas of modern neuroscience research. Within the program are several strong areas of research focus, where in many instances basic scientists and clinical investigators interact to investigate the mechanisms of diseases of the nervous system. In 2002 participating faculty organized into eight research focus groups, within which there is considerable intellectual interaction and collaborative research. In spring of 2006, 3 of these focus groups were expanded to include a Translational component emphasizing interaction between clinical and basic research groups.

Neurological and Neurodegenerative Disorders

Neurological diseases include disorders of the nervous system arising from nervous system malfunction or degeneration. Among these are the movement disorders (which include Parkinson's disease, essential tremor, Huntington's disease, dystonia, myoclonus, Tourettes's syndrome, paroxysmal dyskinesias, drug-induced dyskinesias, restless legs syndrome, spinocerebellar ataxias, spasticity, multiple system atrophy, and progressive supranuclear palsy), dementing diseases (notably Alzheimer's), primary motor diseases (such as amyotrophic lateral sclerosis and multiple sclerosis), and diseases of neurotransmission abnormality (such as epilepsy). The integration of genetic, cellular, and physiological information will be required to unravel the pathophysiology of each disorder and improve therapeutics. Due to aging of our population, movement disorders and dementing diseases will place an enormous and increasing financial burden on society. Investigations by this group will play an important role in the breakthroughs needed to understand and treat these diseases. Current areas of focus include: cellular and network physiology of basal ganglia in the context of Parkinson's disease, neurobiology of neuronal dysfunction and death in Huntington's disease, and molecular biology of synaptogenesis in dystonia. Faculty also study the potential protective effects of hypothermia on cerebral ischemic insults, Alzheimer's disease, and molecular mimicry in immune-mediated neurological disease.

Faculty:

M. LeDoux (head)	<i>Neurology</i>	R. Nelson	<i>Anatomy & Neurobiology</i>
A. Cantrell	<i>Anatomy & Neurobiology</i>	T. Nowak	<i>Neurology</i>
I. Dragatsis	<i>Physiology</i>	R. Pfeiffer	<i>Neurology</i>
E. Geisert	<i>Ophthalmology</i>	W. Pulsinelli	<i>Neurology</i>
D. Goldowitz	<i>Anatomy & Neurobiology</i>	A. Reiner	<i>Anatomy & Neurobiology</i>
R. Homayouni	<i>Neurology/U of Memphis</i>	L. Reiter	<i>Neurology</i>
M. Jacewicz	<i>Neurology</i>	R. Smeyne	<i>Anatomy & Neurobiology/St. Jude</i>
H. Kita	<i>Anatomy & Neurobiology</i>	R. Waters	<i>Anatomy & Neurobiology</i>
M. Levin	<i>Neurology</i>	J. Wheless	<i>Pediatric Neurology/Le Bonheur</i>

Neuro-oncology

Primary brain tumors and tumors metastatic to the central nervous system are relatively common and associated with tremendous morbidity and mortality. The most prevalent form of adult primary central nervous system tumors is collectively referred to as glioma, and the most common and devastating glioma is glioblastoma multiforme. Despite dramatic improvements in neural imaging and neurosurgical techniques, the prognosis for high-grade gliomas has not improved significantly over the last 40 years. Clearly new therapies are needed to overcome the obstacles to treating brain tumors. The focus of the adult neuro-oncology group is to combine large-scale gene expression analysis of patients with brain tumors with cell and molecular studies of cell lines, tissues, and animal models of brain cancer. Research is directed towards the identification of genes associated with central nervous system tumors, understanding the mechanism by which genes affect intra- and extracellular tumor behavior, and the development of therapies that target these genes.

Faculty:

Jon Robertson (head)	<i>Neurosurgery</i>	A. Sills	<i>Neurosurgery</i>
F. Boop	<i>Neurosurgery</i>	J. Sorenson	<i>Neurosurgery</i>
C. Duntsch	<i>Neurosurgery</i>	Z. Xiang	<i>Neurosurgery</i>
Q. Zhou	<i>Neurosurgery</i>	Shelly Timmons	<i>Neurosurgery</i>

Excitable Properties of Neurons

Behavior, mental processes 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. Whether a neuron fires at any given moment is determined by the interaction of intrinsic membrane properties with synaptic inputs. Research in this group focuses on these properties from several viewpoints. At the molecular level, studies determine the genetic capacity for producing proteins related to specific ion channels and neurotransmitter receptors. Expression patterns of the proteins in classes of neurons impart a unique signature of ion channels and receptors. Electrophysiological recordings can reveal the properties of ionic currents underlying particular patterns of firing, the modulation of these currents by neurotransmitters, the precise properties of synaptic input, and the plasticity of neuronal activity. At a more global level, neuronal activity can be studied within an intact neuronal network and correlated with behavior. The common goal of this group is to understand how and why neuronal activity occurs in both normal tissue and in neurological disorders.

Faculty:

W. Armstrong (head)	<i>Anatomy & Neurobiology</i>	P. Herron	<i>Anatomy & Neurobiology</i>
J. Callaway	<i>Anatomy & Neurobiology</i>	R. Nelson	<i>Anatomy & Neurobiology</i>
A. Cantrell	<i>Anatomy & Neurobiology</i>	T. Schikorski	<i>Anatomy & Neurobiology</i>
A. Dopico	<i>Pharmacology</i>	R. Scroggs	<i>Anatomy & Neurobiology</i>
R. Foehring	<i>Anatomy & Neurobiology</i>	S. Tavalin	<i>Pharmacology</i>
M. Ennis	<i>Anatomy & Neurobiology</i>	R. Waters	<i>Anatomy & Neurobiology</i>
D. Heck	<i>Anatomy & Neurobiology</i>	R. Teruyama	<i>Anatomy & Neurobiology</i>
H. Kita	<i>Anatomy & Neurobiology</i>	S. Zakharenko	<i>Anatomy & Neurobiology/St. Judes</i>

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. To understand sensory processing, we need to address the genetic basis of sensory function, the coding of information by individual sensory neurons at several levels of the nervous system, from peripheral receptors to cerebral cortex, and the role of the environment in shaping the responsiveness of these neurons through mechanisms of neuronal plasticity. Interactions between somatosensory and motor cortices, the effects of early alcohol exposure on sensory and motor processing, the control over gustatory information processing by descending influences from limbic forebrain, the genetics of taste processing, the processing of nociceptive (pain) information, and synaptic processing in the olfactory bulb are all areas of research addressed by this group.

Faculty:

M. Ennis (head)	<i>Anatomy & Neurobiology</i>	R. Scroggs	<i>Anatomy & Neurobiology</i>
J. Boughter	<i>Anatomy & Neurobiology</i>	R. Waters	<i>Anatomy & Neurobiology</i>
P. Herron	<i>Anatomy & Neurobiology</i>	Y.-H. Zhang	<i>Anatomy & Neurobiology</i>
E. Johnson	<i>Anatomy & Neurobiology</i>	C. Lemon	<i>Anatomy & Neurobiology</i>
C.-X. Li	<i>Anatomy & Neurobiology</i>	R. Nelson	<i>Anatomy & Neurobiology</i>

Vision and Retina

We rely primarily on our sight to guide us through the world. Our eyes provide the major sensory input to the brain, accounting for one-third of the sensory axons entering the human nervous system. 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. The current program reflects a comprehensive and synergistic approach to important fundamental questions of eye genetics and development and the application of this new strategy to the treatment of disease. These investigators seek to understand normal and abnormal ocular development and how genes control these events. There is an active program in the application of molecular techniques to the modulation of retinal cell growth and cellular responses to injury using gene therapy. Current areas of focus include prevention and treatment of eye diseases and disorders, eye genetics in development and childhood diseases, retinal degenerative diseases, anterior segment disorders, response of the retina and optic nerve to injury, and genetic control of eye development. The primary goal of the vision and retina research group is to provide a framework for effective communications between research laboratories effecting eventually the translation of basic research to clinical applications.

Faculty:

E. Geisert (head)	<i>Ophthalmology</i>	D. Johnson	<i>Ophthalmology</i>
E. Chaum	<i>Ophthalmology</i>	M. LeDoux	<i>Neurology</i>
M. Dyer	<i>Anatomy & Neurobiology/St. Jude</i>	A. Reiner	<i>Anatomy & Neurobiology</i>
M. Fitzgerald	<i>Anat./ Neurobiology/Christian Bros.</i>	M. Watsky	<i>Physiology</i>
D. Goldowitz	<i>Anatomy & Neurobiology</i>	R. Williams	<i>Anatomy & Neurobiology</i>
A. Iannaccone	<i>Ophthalmology</i>	J. Zuo	<i>Anatomy & Neurobiology/St. Jude</i>
M. Jablonski	<i>Ophthalmology</i>	T. Rex	<i>Ophthalmology</i>
J. Steinle	<i>Ophthalmology</i>		

Neurogenetics, Development and Evolution

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. The group is highly collaborative and includes a significant contingent of neuroscientists from St. Jude Children's Research Hospital (primarily the Departments of Developmental Neurobiology and Genetics). Current research tends to rely heavily on genetically defined lines of rodents. Topics of research interest include: control of cell cycling and cell death in the brain, control of axon outgrowth and neurotrophic interactions during neural development, the formation, elimination and stabilization of synapses, functional maturation and environmental/drug sensitivity of the developing nervous system, genetics of disease vulnerability and outcome, and mechanisms of cell migration in the developing brain.

Faculty:

R. Williams (head)	<i>Anatomy & Neurobiology/Pediatrics</i>	P. McKinnon	<i>Anatomy & Neurobiology/St. Jude</i>
J. Boughter	<i>Anatomy & Neurobiology</i>	G. Mittleman	<i>Anat./ Neurobiology/Univ. Memphis</i>
E. Chesler	<i>Oak Ridge National Labs</i>	G. Oliver	<i>Anatomy & Neurobiology/St. Jude</i>
A. d'Azzo	<i>Anatomy & Neurobiology/St. Jude</i>	M. Park	<i>Anatomy & Neurobiology</i>
I. Dragatsis	<i>Physiology</i>	A. Reiner	<i>Anatomy & Neurobiology</i>
A. Elberger	<i>Anatomy & Neurobiology</i>	L. Reiter	<i>Neurology</i>
D. Goldowitz*	<i>Anatomy & Neurobiology</i>	B. Sharp	<i>Pharmacology</i>
K. Hamre	<i>Anatomy & Neurobiology</i>	R. Smeyne	<i>Anatomy & Neurobiology/St. Jude</i>
M. Honig	<i>Anatomy & Neurobiology</i>	D. Swanson*	<i>Anatomy & Neurobiology</i>
R. Homanyouni	<i>University of Memphis</i>	Y. Tong	<i>Anatomy & Neurobiology</i>
L. Lu	<i>Anatomy & Neurobiology</i>	R. Waters	<i>Anatomy & Neurobiology</i>
J. Morgan	<i>Anatomy & Neurobiology/St. Jude</i>		

* Moved from UT mid-year

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. Research is currently being conducted using both *in vivo* and *in vitro* models. Molecular, cellular, neuroanatomical, neurophysiological, neurochemical, morphological and behavioral approaches are all being used to study the neuroscience of mental and addictive disorders. Research efforts are currently focused on depression and antidepressants and drugs of abuse, including cocaine, amphetamine, nicotine, ethanol and toluene. Several collaborative efforts currently exist within the group, including studies on drug effects on ion channels, drug-receptor adaptations, developmental neuroplasticity and interactions between stress and drugs.

Faculty:

B. Sharp (head)	<i>Pharmacology</i>	J. Steketee	<i>Pharmacology</i>
A. Dopico	<i>Pharmacology</i>	S. Tavalin	<i>Pharmacology</i>
A. Elberger	<i>Anatomy & Neurobiology</i>	F. Zhou	<i>Pharmacology</i>
S. Matta	<i>Pharmacology</i>		

Neural Cell Signaling

The function, growth and survival of neural cells are regulated by extracellular and intracellular signals. One example is the release of neurotransmitter from a presynaptic neuron, which is sensed by the postsynaptic neuron via receptors that recognize specific neurotransmitter molecules. This information is relayed to the cell's interior by a series of elaborate and interdependent signaling intermediates and results in a change in the cell in response to its environment. This diverse group of researchers is investigating those processes that are collectively referred to as signal transduction using neural or neural-derived cell systems. Indeed, most drugs that are currently used in the management of neurological disorders, such as ADHD, depression, schizophrenia, Parkinson's disease and others, exert their effects on signaling components. The goal of this group is to understand the involvement of signal transduction in both the normal functioning of neural cells and those pathological changes that are manifested in neurological disorders. Current areas of emphasis include: G-protein-coupled receptor signaling and regulation, growth factor receptor signaling, apoptosis, cellular migration, and mechanisms of neuronal injury and repair.

Faculty:

S. Senogles (head)	<i>Molecular Sciences</i>	M. LeDoux	<i>Neurology</i>
S. Bahouth	<i>Pharmacology</i>	K. Malik	<i>Pharmacology</i>
E. Chaum	<i>Ophthalmology</i>	J. Sorenson	<i>Neurosurgery</i>
M. Dahmer	<i>Molecular Sciences</i>	S. Tavalin	<i>Pharmacology</i>

C. Duntsch	<i>Neurosurgery</i>	R. Waters	<i>Anatomy & Neurobiology</i>
R. Foehring	<i>Anatomy & Neurobiology</i>	T. Yoo	<i>Medicine</i>
D. Johnson	<i>Ophthalmology</i>	M. Jablonski	<i>Ophthalmology</i>
J. Jagers	<i>Physiology</i>	Q. Zhou	<i>Neurosurgery</i>

Translational Neuroscience

The NI continues to promote **Translational Neuroscience**. Below is a description of three **Translational Focus Groups** and the outlines of their respective projects.

To maximize these efforts in the NI, three areas of emphasis have been identified: **Neurodegenerative Diseases, Developmental Neurobiology, and Drug Abuse (Brain, Mind and Behavior)**. These areas have been picked among others because of the existing core of NI scientists and, more importantly, because each problem has widespread visibility throughout Tennessee, demanding our attention and help.

Focus 1: Neurodegenerative Diseases (Leader, M. LeDoux, M.D., Ph.D., Neurology, UTHSC)

Human thought and behavior are a function of nervous system activity. Neurodegenerative diseases attack both, often simultaneously, and in the worst cases lead to years of debilitation and death, with the aged especially vulnerable. The substantial burden on the family as well as the health care system is obvious. Dissection of specific human neurological diseases in order to identify therapeutic targets and implement disease-modifying therapies requires expert clinical neurologists and neuroscientists with skill sets that cover the gamut from neurophysiology and neuropharmacology, to molecular neurobiology and neurogenetics. The NI contains several strong areas of disease-specific research, where basic scientists and clinical investigators interact to investigate the mechanisms of relatively common sensory-motor disorders like Parkinson's disease. Concomitantly, clinical neuroscience research related to many of the movement disorders is robust. Thus, the framework is in place at UTHSC for a vigorous program of translational Neuroscience research in the area of neurodegenerative diseases.

Neurodegenerative disease impacts a significant percentage of the U.S. population, and in many disorders the occurrence increases with age. For example, Parkinson's disease currently affects ~1.5 million people in the U.S., but 1 in 100 people over the age of 65 are afflicted, with the average age of onset being 60 years (National Parkinson's Foundation; CDC). Similarly, although the national prevalence of Alzheimer's disease is ~1.5% (afflicting some 4 million people), the frequency increases to 3% for men and women between ages 65-74, and it is

estimated that 50% of those reaching 85 may have the disease (CDC; NIMH)! Multiple sclerosis currently afflicts some 400,000 U.S. citizens, but Tennessee has a rate higher than the national average. Neuropathy (a.k.a., neuritis), a peripheral nervous system inflammation producing pain, loss of sensation, and/or loss of muscular control, may be the most common single nervous system disorder, as it also accompanies many diseases of non-neuronal primary origin. Most notably, neuropathy accompanies 80% of the cases of type II diabetes, a disease found in some 8 million Americans and in a disproportionately high percentage of Tennesseans.

Translational Research Areas:

Support will focus on neurological disorders with expertise in the NI, and considered ripe for translational efforts. The primary effort of the NI will be on Parkinson's disease, Alzheimer's disease and multiple sclerosis. Presently there are clinical trials covering Parkinson's, Huntington's disease, dystonia, restless legs syndrome, neuropathy and multiple sclerosis in the UT Dept. of Neurology. An Alzheimer's specialist has recently been hired into this department as well. In support of this clinical research, many basic scientists in the NI are studying the related brain areas, including neuroanatomists, neurophysiologists and neurogeneticists. Statewide, the Division of Neurology at the UT Knoxville Department of Medicine has faculty with Alzheimer's expertise, and this campus also has two strong basic scientists studying the disease. Translational research initially will focus on the genetic basis of disease and its susceptibility to treatment. Disease-associated DNA polymorphisms and their gene products will represent a strategic target for the group.

Focus 2: Brain, Mind and Behavior (Leader, Burt Sharp, M.D, Chair, Pharmacology, UTHSC.)

The central nervous system is the target of the drugs that are abused by individuals at all ages. It is the reinforcing properties of these drugs that initially lead to abuse. Subsequently, long-term changes in brain chemistry and morphology take place, resulting in drug craving and severe disruption of normal behavior and social functioning. A translational approach to drug abuse research will foster interactions between basic and clinical investigators that engender a more powerful understanding of the impact of drugs of abuse on brain and behavior. Routine cooperation and collaboration between basic and clinical scientists will also result in the identification risk factors for abuse within subpopulations of Tennesseans, along with novel therapies that target high risk groups.

Memphis is no exception to the national trend in drug abuse and its co-morbid disorders (e.g., depression). Compared to 5 of its 8 neighboring states, Tennessee has higher rates of illicit

drug use by its entire population (National Household Survey on Drug Abuse, 1999 and 2000). The association between depression and drug abuse is shown based on national figures. The high level of drug abuse amongst Tennesseans 12 years of age or older involves a large number of individuals: 286,000 persons per month used various illicit drugs (e.g., cocaine, marijuana), of which 48,000 were teens between 12 and 17 years of age. In addition, one million three hundred thirteen thousand (1,313,000) Tennesseans, age 12 or older, used tobacco – a known gateway to the use of illicit drugs. Of these, 78,000 teens used tobacco products. On a national scale, the interaction between illicit drug abuse and depression is demonstrated by the markedly increased prevalence of substance abuse among all individuals aged 12 or older who suffered a major depressive episode during 2004: 28.8% of those who suffered a major depressive episode used illicit drugs compared to 13.8% of those who did not experience a major depressive episode. Moreover, the prevalence of heavy alcohol use or cigarette smoking was higher in those who suffered a major depressive episode (alcoholism 9.2% vs. 6.9%; cigarette smoking 25.5% vs. 15.1%).

Translational Research Areas:

- Drug abuse and co-morbid disorders

A major goal of this focus is the development of new definitions for clinical subtypes that depend on specific neurochemical, genetic and brain imaging patterns in patients, along with accurate behavioral profiling of antecedent history and response to intervention utilizing specific agents in clinical trials. These studies will entail reciprocal interactions between basic and clinical investigators, along with critical support from core facilities for genotyping (i.e. ID of single nucleotide polymorphisms, repeats, inversions, translocations, etc.) of probands and multigenerational families. fMRI imaging facilities will be critical in order to gain insight into brain dysfunction and its response to drug trials. Basic scientists will apply molecular, electrophysiological, neurochemical, behavioral and fMRI imaging technologies in animal models to understand fundamental aspects of the interaction between drugs of abuse and co-morbid disorders. Many of these interactions are based on known clinical observations, although novel clinical data, which further refine the hypotheses of basic neuroscientists, will undoubtedly derive from meticulous, high resolution, multi-parameter clinical studies. Our existing electrophysiological, neurochemical and behavioral equipment, facilities and faculty expertise in these areas are strengths of UTHSC. Existing genetic models along with novel knock-ins of homologous human mutations in mice will be powerful arrows in the quiver of basic scientists. This will require molecular expertise for the development of suitable genetic constructs and reliable, committed core expertise to generate, breed, validate and house recombinant mice.

Adolescents are especially vulnerable to dependence on drugs of abuse, and this dependence is often a lifelong struggle. Therefore, initially, these studies will focus on adolescents in both human populations and animal models.

- Vulnerability to, and developmental effects of drug abuse

Vulnerability to drug abuse is little understood, but certainly varies with age, as do the effects of drugs of abuse on brain function. Both vulnerability to abuse and drug effects may in turn reflect age-dependent alterations in neuronal connectivity and neuron function within the brain regions and circuits that subservise the associative learning and reinforcing properties of drugs and the response to environmental stressors and co-stimuli associated with drug seeking behavior. Thus, basic and clinical collaborations will identify biological markers of vulnerability to drug abuse in human populations and animal models of drug exposure initiated within the following time periods: gestation, adolescence, young adult, and geriatric. These studies will utilize the core fMRI imaging and genotyping technologies, along with the range of approaches mentioned in the foregoing paragraph. **This past year, we committed \$40,000 in research funds to this area for pilot research in support of their attempts to achieve a Center grant in the Developmental Effects of Drug Abuse from NIDA.**

Focus 3: Brain Development (Leader, Dan Goldowitz*, Ph.D.)

Understanding brain development is key to understanding adult cognition and behavior. Developmental dysfunctions can occur through inheritance, through pre- and perinatal trauma or toxicity, or even from the lack of meaningful social interaction during early life. The study of brain development is a major strength in the NI. Disorders with a strong clinical base (e.g., LeBonheur, Boling Center) include autism, learning disabilities, attention deficit disorders and epilepsy. Basic research ranges 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. We also anticipate considerable overlap with the Drug Abuse focus group as relates to brain development (see above). The group is highly collaborative and includes a significant contingent of neuroscientists from St. Jude Children's Research Hospital (primarily the Departments of Developmental Neurobiology and Genetics) and the University of Memphis. The genetics aspect in particular has received worldwide recognition in providing the Mouse Brain Library as well as other shared, web-based data sources. Last but not least, both clinicians and researchers in this area have strong ties to the Urban Child Institute to lead us out of the parochial realm of a medical school to be engaged and enriched by multidisciplinary approaches that focus on children aged 9 months to 3 years.

**Dr. Goldowitz moved mid-year*

Translational Research Areas:

- Perinatal hypoxic ischemia

Hypoxic ischemia (HI) during perinatal life has a major, detrimental impact on the development of the nervous system, yet currently there is no effective neuroprotective therapy. Annually, it is estimated that neonatal stroke occurs in 4-5/1000 live births with an additional 20:1000 full-term births experiencing severe asphyxia. At least 25% of neonates suffering HI will develop some form of long-term debilitation, including mental retardation, a learning disability, epilepsy (also see below) and/or paralysis (NIH-NINDS)-this statistic may be an underestimate since the symptoms of HI may go unrecognized until later childhood. While there can be multiple causes of HI, prime among these and over represented in the Memphis area is pre-eclampsia (maternal hypertension). Whereas improved perinatal care has increased survival rates for both term and preterm infants suffering HI, and there are effective treatments (e.g., magnesium sulfate) to control the maternal seizures that result from pre-eclampsia, the decrease in infant mortality has not been correlated with improved neurological outcomes, further stressing the need of therapeutic intervention during pregnancy. Furthermore, some treatments for the mother's condition may have untoward effects on fetal nervous system development. Additional risk factors that could potentiate the ill effects of HI are various sorts of maternal drug abuse (e.g., cocaine, heroin, alcohol), and even cigarette smoking.

Neonatology and the Boling Center are currently developing an expanded follow-up program for high-risk neonates that will be critical to the systematic measurement of outcome in these children. The governor's and mayors' special initiatives on reducing high levels of infant mortality in Tennessee, Memphis especially, highlights the importance of these areas. Model systems are being developed at the research end that include hypoxia chamber and the mouse ligation model, female self administration of nicotine prior to pregnancy, and cell culture hypoxia, that are seen to be the preclinical tools for validation of interventions and testing of causation. Significant interaction between this effort and that of drug abuse (see above) would be expected.

- Autism

Autism and associated autism spectrum disorders (ASDs) have received a major focus from funding agencies and represent an exciting window into understanding higher brain function. ASDs are brain development disorders that characterized by abnormal social interactions, communication abilities, patterns of interests, and patterns of behavior. Whereas NIH lists frank autism prevalence at about 0.1%, according to the National Autism Association, 1 in 150 children have an ASD. To date, researchers have found several genes associated with ASDs. Fortunately

for UT, the study of ASDs has a strong clinical component at the Boling Center and UT Pediatrics. There is a core of basic scientists within the NI interested in ASDs, covering behavioral, genetic and neuronal developmental aspects of animal models. We have the potential to develop strong collaborations with the Univ. of Memphis and Vanderbilt University. **This year, we have committed to co-sponsoring an Autism research group and seminar series, with the Boling Center, and the Clinical Translational Science Institute.**

- Pediatric Epilepsy

Epilepsy is a relatively common disorder affecting ~1% of the U.S. populace (Epilepsy Foundation; Center for Disease Control). More striking is that some 10% of the population will suffer a seizure during their lifetime. Characterized by uncontrolled brain seizure activity, epilepsy can have with multiple origins (genetic, trauma) and a spectrum of seizure types. For children, the first year of life carries the highest risk, where seizures can be damaging and life threatening. Childhood epilepsy (~ 1/2 of the epilepsy cases nationwide) is more likely to be associated with genetic origins compared to adults, where stroke and accidents play greater roles). Epilepsy also targets minorities and those of lower socio-economic status with greater frequency. While in many cases seizures are well controlled with medication, a significant number of children are resistant to medical treatment, and other treatments carry significant side effects. "Designer drugs" for epilepsy provide increased hope of a better quality of life for many young patients with epilepsy.

Neurologists at Le Bonheur are investigating anti-seizure medications not yet on the market, and will be using state of the art magnetoencephalography to assess drug actions on human brain activity. This work could benefit from translational interactions as basic researchers discover the mechanisms of actions of anti-epileptic drugs and help refine compounds to more precisely target seizure activity while avoiding debilitating side effects. Additional neurophysiological investigation of excised, epileptic tissue would help uncover the mechanisms underlying epileptic foci. **This year we have funded one pilot project and have plans to support another in Pediatric Epilepsy.**

VII. FACULTY PUBLICATIONS

The Neuroscience faculty at UT is consistently productive, both in terms of peer-reviewed publications and participation in the national neuroscience community. **Their competitiveness for extramural funding is the strongest possible measure of the faculty's excellence**, as it reflects not only the quality of their research and publications, but also their national and international reputations. Lists of 1) peer-reviewed journal publications

during the last academic year, as cited in PubMed, and 2) presentations at the 2006 meeting of the Society for Neuroscience in Atlanta, GA are presented in **Appendix 2**. These PubMed-cited publications do not include the many chapters, reviews and other articles written by UTNI faculty. Faculty members of UTNI are indicated in **bold** in **Appendix 2**.

VIII. GRADUATE AND POSTDOCTORAL TRAINING

The Graduate education at UTHSC has moved away from department-based graduate programs to a single Integrated Program in Biomedical Sciences (IPBS) for students in the health sciences. Students matriculate into this integrated program, which in its first year requires broad interdisciplinary training in cell and molecular biology and in systems biology. Within the IPBS, each student chooses one of a number of tracks, of which Neuroscience is one. Students who enter the graduate program are eligible for predoctoral stipends and a waiver of tuition. The Neuroscience Institute funds the stipends for students in the Neuroscience Track for the first two years of graduate training, after which they are funded by their mentors.

Students in the Neuroscience track take a sequence of several graduate courses. In the first year, students enroll in Cell and Molecular Biology, Neuroscience Seminar, Systems Biology (which includes the nervous system), and Neuroscience Student Symposium. In future years, each student continues with Neuroscience Seminar and Neuroscience Student Symposium and must take Functional Neuroanatomy. In addition, the student chooses two elective courses from among Cellular Neuroscience, Behavioral Neuroscience or Developmental and Molecular Neurobiology. A wide variety of additional courses are available to Neuroscience graduate students on the UTHSC campus, including courses in biochemistry, physiology, pharmacology, histology, and genetics.

In addition to their coursework, graduate students register for four laboratory rotations during the first year of graduate study in order to help them choose a research mentor. They typically enter a laboratory during their second year and begin to acquire the specialized training they will need to complete their doctoral dissertations. The Ph.D. degree is granted through the College of Graduate Health Sciences. The degree requires a minimum of six semesters of graduate work and normally requires from three to five years to complete.

During the past academic year, the NI supported one graduate student and three postdoctoral fellows/research associates; all the rest were supported by individual research grants to the NI faculty. Two graduate students previously supported by the NI were awarded the Ph.D., both within the Department of Anatomy and Neurobiology. This year the NI has taken a more active role in the national recruitment efforts for the graduate program (see Goals below and **Appendix 4**).

IX. NEUROSCIENCE SEMINARS

During the 2007-08 academic year, the UTNI sponsored the weekly Neuroscience Seminar Series, hosting 21 seminars. Of these, 16 neuroscientists from outside and 5 within the NI presented their recent research findings to UT faculty and students. In addition, the NI sponsored two Translational Neuroscience Symposia, where clinical and basic neuroscientists presented their data on Alzheimer's Disease (co-sponsored with CTSI) and Ophthalmic Genetics (co-sponsored with Hamilton Eye Institute and CTSI). In these symposia, we invited 5 internationally recognized scientists to speak with 2 NI members. The 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. 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. A complete list of FY 2007-08 seminar speakers and their topics is provided in **Appendix 3**. Also attached in **Appendix 4** are the flyers for the Translational Neuroscience Symposia, and a symposium during Brain Awareness Week, co-sponsored with the Urban Child Institute, on "Brain Imaging and its use in Developmental Disorders".

X. GOALS OF THE INSTITUTE AND RECENT ACCOMPLISHMENTS

Four long-range goals of the UT Neuroscience Institute were established in 1985. These were set to promote excellence in Neuroscience research, education and patient care and to facilitate public awareness of Neuroscience efforts at UT. While these goals are generally current, we have pursued fostering the development of clinical Neuroscience research this past year, and will do so more in the coming year. The details are provided under

Goal 1. Augment our already strong research efforts in Neuroscience by a) recruitment of new faculty, b) renovation of facilities, c) acquisition of equipment, d) developing major programmatic activities, and e) creating a focal point to promote the exchange of information among our research faculty.

1a. Faculty recruitment. During the past academic year, 5 new faculty members became affiliated with the UTNI: Tania Rex, Ph.D. (Ophthalmology), Kathryn MacVicar, M.D., (Pediatric Neurology, Le Bonheur), Helena Parfenova, Ph.D. (Physiology), Massroor Pourcyrus, M.D. (Pediatrics), and Shelly Timmons, M.D. (Neurosurgery)

1b. Renovations. Renovations of Neuroscience space were largely completed in 2002, with the completion of level 3 Wittenborg building. The Institute primarily occupies ~64,000 sq. ft of modern lab and

office space in the adjacent Wittenborg (all floors), Link (two floors) and Johnson (1 floor) buildings, which house the Anatomy and Neurobiology, Neurology, and Neurosurgery departments. Additional NI faculty occupy substantial laboratory space within their respective departments. Of particular note are several members of the NI in the Pharmacology department, housed in the Crowe building on the same quad as the three aforementioned buildings.

Ic. Acquisition of equipment/Imaging Center During the past year, NI continued startup funds for faculty initially recruited in 2002-2003, which went for primarily supplies and equipment in their laboratories (balance remaining for FY 2008-09, \$44,000). As detailed in the Budget section, we spent \$~20,000 towards a shared Solamere Systems Spinning Disk Confocal microscope, \$22,785 upgrading the NeuroLucida workstation in the NI Imaging Center to support unbiased stereological measurements, a new high-resolution digital camera, and a new computer for the workstation. NI has also contributed matching funds for multi-user equipment grants, including those obtained from NIH for an electron microscope, for a confocal microscope, for a computerized light microscope for three-dimensional neuronal reconstructions, and 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 Director (Kathy Troughton) provided by the NI. The web site for the Imaging Center was completed overhauled this past year (http://www.utmem.edu/neuroscience/imaging-center/index.php?doc=m_content.inc). We also initiated on line scheduling this year. Maintenance of equipment (*e.g.*, service contracts) is largely (70-80%) paid through user fees, but the NI has contributed the balance when necessary to keep user fees low. Our Bio-Rad confocal microscope is no longer covered by a service contract. Thus, we will have to purchase a new confocal microscope in the near future.

Id. Developing major programmatic activities. Several areas of research focus exist within the UTNI and are consolidated into eight research groups. These areas include: 1) Neurological and Neurodegenerative Disorders, 2) Neuro-oncology, 3) Vision and Retina, 4) Neurogenetics, Development and Evolution, 5) Sensory Information Processing, 6) Excitable Properties of Neurons, 7) Mental and Addictive Disorders and 8) Neural Cell Signaling. These areas of focus provide for interaction among faculty in different departments and promote collaborative research activities, focused journal clubs, and other programmatic interactions conducive to interdisciplinary neuroscience research and training. The details of this organization are provided above.

In the Spring of 2006, we expanded three of these areas to include Translational Focus Groups: Neurodegenerative Diseases, Developmental Neurobiology, and Drug Abuse (Brain, Mind and Behavior). The goals and relationship of these focus areas to the other groups and the NI are detailed in Future Goals below. These areas have been picked among others because of the existing core of NI scientists and, more importantly, because each problem has widespread visibility throughout Tennessee, demanding our attention and help.

This past year, the NI embarked on a mission to support the acquisition of large scale, programmatic grants

by supporting Pilot Research grants. Examples are the Integrative Neuroscience Initiative on Alcoholism (INIA) consortia from the National Institute on Alcohol Abuse (NIAA) and Alcoholism to NI members Dan Goldowitz, Rob Williams at UTHSC, and Guy Mittleman (NI member from University of Memphis). Other programmatic funding stems from a Vision Core grant to Dianna Johnson from the National Eye Institute, and the Neurohistological Core grant to Dr. Elberger from NIAA. The NIAA grants in particular have focused much NI activity on the study of alcohol's effects on gene mutation and on the developing nervous system.

UTNI projects that may be of particular value to **Tennessee industry, government or culture** are:

- Basic science projects address the underlying causes of the devastating neurodegenerative disorders, Alzheimer's disease, Huntington's disease, and Parkinson's disease. A significant fraction of the Tennessee population will be affected by these disorders, either as a victim or a caregiver. Any progress made toward understanding the mechanisms of these diseases or developing therapeutic options will have a positive impact on the citizenry through increasing health and longevity and decreasing the economic burdens imposed by these disorders.
- Basic science research on fetal alcohol effects on brain development. There is a relatively high incidence of prenatal effects from substance abuse among the Tennessee population. Projects also address the interaction of alcoholism, stress and genetics to determine if there are preventable combinations. Absences, injury and lack of productivity due to substance abuse in adults is a significant problem in Tennessee.
- Ongoing efforts to develop drugs to treat brain cancers, especially glioblastomas.
- Investigation of the cellular mechanisms of adult brain tumors, especially glioblastomas, in an effort to understand and control cell proliferation in patients with these tumors.
- Research to determine whether remediation of functions (such as basic forms of learning and memory) can be obtained with endogenous trophic proteins in a rat model that mimics some aspect of Alzheimer's disease.
- Research on the basis of neurodegenerative diseases of the eye and brain, which helps to provide insight into therapies to combat such diseases. The goal is to learn how to keep eyes and brains healthier for longer in Tennesseans and all other people.
- Ongoing research on the behavioral biology of addiction, including nicotine and alcohol addiction, depression, and stress.
- The NI faculty participate heavily in a number of educational programs for minority students, as delineated below.

1e. Creating a focal point to promote the exchange of information among our research faculty. The organization of the UTNI into research focus groups is a primary means of promoting interactions among NI

faculty and students. In addition, there are several other avenues for the exchange of information:

1) Over one thousand posters describing the interdisciplinary Graduate and Postdoctoral Program in Neuroscience are distributed yearly to undergraduate institutions in Tennessee and nearby states.

2) The UTNI Neuroscience Seminar 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 past year, there were 33 seminars: 28 by visiting neuroscientists and 5 by UTNI faculty. Announcements are mailed to all participating faculty and students and are posted at various points throughout the UTHSC campus.

3) Two web servers are housed in the UTNI. One provides information on the NI and is a recruitment tool to attract first-rate neuroscience students and faculty. This site, at <http://www.utmem.edu/neuroscience>, has been expanded and now includes all of the services offered by the Neuroscience Imaging Core, the efforts behind our Translational Neuroscience Research and Pilot Program initiatives, Neuroscience Undergraduate Scholars, Neuroscience Track students, among other items. The other server, is run by Prof. Rob Williams and offers Neuroscience faculty worldwide an avenue to present their research findings and search neurogenetic data, and is used daily by more than 100 scientists throughout the world. The servers may be found at: <http://www.nervenet.org/main/databases.html> and include the Mouse Brain Library, Complex Trait Analysis, Virtual Microscopy, Web QTL Project, among others.

Goal 2. Promote education and research training in Neuroscience at the predoctoral (including undergraduate and graduate students, dental, medical and other professional students and minority students) and postdoctoral (including Ph.D.s, interns and residents) levels of students at UT and other Tennessee institutions.

2a. In conjunction with the **NIH Medical Student Research Fellowship Program** in the College of Medicine, NI faculty offered summer laboratory experiences to the following medical students:

**University of Tennessee College of Medicine
NIH Medical Student Research Fellowship Program
2008 Summer Research Fellows**

<u>Student</u>	<u>NI Preceptor, Department</u>	<u>Project Title</u>
Chumpia, MayAnne	Bahouth, Suleiman, Ph.D. Associate Professor, Pharmacology	Using a cAMP sensor to demonstrate the role of the type I PDZ Motif in promoting fidelity of signaling by the human B1-adrenergi receptor
Cohen, Eric M.	Lawrence M. Pfeffer, Ph.D.	Improving interferon's anti-cancer activity against renal

Dawkins, Ross	Professor, Pathology Lawrence M. Pfeffer, Ph.D.	cell carcinoma by targeting the NF- κ B pathway Characterization of cancer stem cell like populations in oral squamous cell carcinoma
Irwin, Andrew N.	Professor, Pathology Edward Chaum, M.D., Ph.D.	Delivery of drugs to the cornea using a novel microscale fabricated instrument
Luzny, Patrick	Professor, Ophthalmology Jonathan H. Jaggar, Ph.D. Associate Professor, Physiology	Regulation of arterial myocyte ca ²⁺ channel cav in hypertension
Milam, Sarah	Charles W. Leffler, Ph.D. Professor, Physiology	Time dependent actions of CO on the newborn cerebral vasculature
Nagle, Mary E.	Lawrence T. Reiter, Ph.D. Assistant Professor, Neurology	The role of the hypoxic response in <i>drosophila</i> border cell migration
Parlaman, Joshua	Peter McKinnon, Ph.D. Associate Professor, Anatomy and Neurobiology	ATM and the response to DNA single strand breaks in the nervous system

2b. Training for underprivileged students continues to be active and supported by NI neuroscientists and their laboratories through funds from the state of Tennessee, the college of Pharmacy, and Rust College. Currently, NI involvement is housed under the **Prescience Program** (part of a Summer Research Scholars Program administered by UTHSC graduate college), which provides financial support for summer research internships, and is administered by NI member Prof. E. J. Johnson. The **Prescience Program** provides basic science career exposure (research laboratory apprentice-preceptorship) and basic science skills reinforcement activity for scholarly oriented high school and college minority students. Students are paired with an undergraduate apprentice with a Ph.D. or M.D. biomedical scientist preceptor in a one-to-one relationship. This association and environment are designed to inform the student of the undergraduate prerequisites and essential course work that are required to pursue doctoral studies and to inform them of the demands and relevance of communications skills, mathematics, and science to the conduct of biomedical research.

2c. This year marks the third year for awarding **Undergraduate Neuroscience Scholarships** to outstanding undergraduates at Rhodes College and Christian Brothers University. These scholars are picked by the respective institutions for their interest in Neuroscience and their academic performance, and placed in NI labs at UTHSC for two summers. The scholars work on independent projects for their undergraduate thesis. The new scholars for 2008 are Michael Antone from Christian Brothers University (Kristen Hamre, Anatomy and Neurobiology sponsor) and Daniel Wilkinson from Rhodes College (Charles Leffler, Physiology, sponsor). NI also briefly supported a third scholar, Lorna Wilkes (Christian Brothers University), who had to leave the program for personal reasons. One of last year's scholars, Indire Augustinaite from Christian Brothers University, is shown presenting her work at the Christian Brothers University annual research day. (see photo, **Appendix 4**). One of last year's scholars, Teresa Bell, presented her work at the annual Society for Neuroscience convention in San Diego, CA (see Bell et al, **Appendix 2**)

2d. In 2007-2008 NI also supported **recruitment of graduate students into the Neuroscience Track of**

Interdisciplinary Program for Biomedical Sciences by creating and circulating a flyer to 200 different undergraduate biology, psychology, and neuroscience programs nationwide. A copy of the flyer can be found in **Appendix 4**. An updated flyer will be distributed in September, 2008. This past year NI provided full support to Ms. Jeri Bryant, a minority student. In addition, NI provided matching travel funds for all students presenting their work at national meetings. Our intention for the coming FY is to provide matching funds for stipends to NI faculty on a competitive basis, in support of neuroscience track graduate students in the IPBS graduate program. We recently pledged matching funds for 5 Neuroscience Track students for FY 2008-09.

Goal 3: Hasten the application of the latest and most promising scientific information to the clinical treatment of neurological diseases (e.g., Parkinson's disease, Alzheimer's disease, stroke, spinal cord injury, neurotrauma, brain tumors, and multiple sclerosis) by integrating educational and research programs.

3a. The Neuroscience Seminar series, conferences and workshops encourage participation by the faculty, and collaborative research activities, especially those between basic scientists and clinical faculty. Several of the research focus areas of the NI are devoted primarily to study of the basic biology of human disease, including the groups for Neurological and Neurodegenerative Disorders, Neuro-oncology, Vision and Retina, and Mental and Addictive Disorders. This aim was addressed by the formation of three **Translational Neuroscience Focus** areas in 2006. This year we held two **Translational Neuroscience Symposia** (See **Appendix 4** for flyers), and held one special public lecture event at the Pink Palace Museum (**Appendix 4**). These symposia featured clinical and basic scientists, and attempted to elucidate how interaction between clinicians and basic research scientists can facilitate treatment of neurological disease in the areas of Alzheimer's Disease, Ophthalmic Genetics. The Pink Palace event was a public lecture on Alzheimer's disease given by Pierre Tariot, M.D., of the Banner Alzheimer Institute. In addition, the NI will further clinical, patient based and translational Neuroscience at UTHSC by helping to equip the Neuroscience Imaging Core with cutting edge neurobiological imaging tools, and by pilot translational work. This past year we partnered with the Department of Neurology in the hiring of Michael McDonald, a mouse behaviorist specializing in genetic models of neurological disease. The NI will pay a part of Dr. McDonald's salary for 4 years, and provides his office space. We also expect to work closely with the Clinical Translational Science Institute. The Neuroscience Imaging Core is partnering with the CTSI, and Dr. Armstrong serves as Director of Imaging in the Research Technical Unit, for the CTSA application currently in revision.

3b. Pilot Research and Other Projects funded by NI. During 2007-2008 the NI and its Executive Committee began programmatic support of Neuroscience Research on campus. This included developing two calls for research proposals, and merit review of applications by the NI Executive Committee. We reviewed

over 15 applications, and do date. We spent \$221,905 this past year, and we have committed \$237,933 for FY 2008-09. The clinical projects are supplemented by COM- \$67, 171 this past year, and \$157,933 for the coming year (see #2 below).

-Basic Science. In 2007-2008 the NI solicited applications for neuroscience research projects aimed at developing large-scale NIH grants. Two \$40,000 grants were awarded after merit review: Burt Sharp, M.D., Professor and Chair of Pharmacology; Rex, Ph.D., assistant professor in Ophthalmology (**please see announcements and award notices in Appendix 5**). The projects were awarded Feb. 1, 2008-Jan. 31, 2009, with an option for 1 year renewal should funds be available and progress has been made.

-Clinical Research. The NI solicited applications for Clinical Neuroscience research pilot projects aimed at developing clinical scientists and facilitating their ability to achieve NIH grants. To date, 4 awards have been given: Mark LeDoux, M.D., Professor of Neurology (\$80,000); Massroor Poucyrous, M.D., Professor of Pediatrics (\$50,000, Dave Clarke, Assistant Professor of Pediatrics (\$50,000), and Alex Auchus, M.D., Professor of Neurology (\$50,000). The amounts reflect the total support, which includes 50% matching from the College of Medicine. Our intention is to fund one additional project to these, this FY.

-Neurotrauma Center. In the Spring of 2008 the NI also partnered with the College of Medicine to support a Neurotrauma Center where ongoing clinical trials on head injury are being carried out. The NI supports the research coordinator of this Center, which is directed by NI member Shelly Timmons, MD (Neurosurgery). This past year Dr. Timmons received ~\$27,171 from NI, an amount matched by the COM. The NI commitment for FY 2008-2009 is \$17,933.

Goal 4: Interact with the faculty of other UT campuses and neighboring undergraduate institutions

Some UTNI faculty are involved in some large multi-institutional grant programs, involving a number of universities (listed above). There is considerable collaboration between UTNI faculty on the UTHSC campus and investigators at St. Jude Children's Research Hospital and at the University of Memphis. Current collaborative projects include INIA consortia sponsored by NIAA (see above).

In addition to research collaborations, we continue to sponsor the Neuroscience Seminar Series on the UTHSC campus, which is often attended by faculty and students from other Memphis institutions, and our faculty are involved in workshops and seminars at other institutions and at national meetings. Our newly installed Translational Neuroscience Symposia brings together clinical and basic research scientists from our various local sites and outside speakers.

The UTNI continue their community interaction with the First Year's Institute and the Urban Child Institute with a **community forum** during **Brain Awareness Week** at the Urban Child Institute. This program, entitled **"Brain Imaging and its Use in Developmental Disorders"**, was directed toward parents, teachers, and other professionals involved in the care and early instruction of children. The program was organized by NI member Dr. Paul Herron, and was hosted by NI Director William E. Armstrong. Two talks on imaging were featured.

Dr. Mark McManis (Department of Pediatrics and Pediatric Neurology, Le Bonheur), spoke on the use of the new technology provided by magnetoencephalography. Dr. Robert Ogg of St. Jude Children's Hospital spoke on recent advances from brain imaging using functional magnetic resonance. Over 150 parents and healthcare professionals attended this event, which generated considerable discussion among the participants. The flyer on this Brain Awareness Week event is provided in **Appendix 4**, as is reportage from The Record, with photos.

APPENDIX 1

External Funding of Neuroscience Institute Faculty

FY 2007-08

<i>P.I.</i>	<i>Project Name</i>	<i>Agency</i>	<i>Project Period</i>	<i>Direct Costs FY 2007-2008</i>
Armstrong, W.	Electrophysiological correlates of vasopressin release NS 23941	NIH	12/01/05 11/30/09	\$196,628
	Plasticity of oxytocin neurons during lactation HD 41002No Cost Extension	NIH	06/30/01 07/30/08	\$172,701
Auchus, A.	EISAI-Pfizer Study	Clinical Trial	09/24/07 06/30/07	\$72,374
	Elan Pharm (301 Study)	Clinical Trial	05/21/08 12/31/10	\$281,511
	Elan Pharm (302 Study)	Clinical Trial	05/21/08 12/31/10	\$209,783
Bahouth, S.W.	Role of the B1-Adrenergic Receptosome in Trafficking and Signaling of the Receptor	SE AHA	07/01/08 06/30/10	\$150,000
Blatteis, C.	Pge2 and fever: insight from transgenic mice models NS38594	NIH	07/25/00 10/31/07	\$250,000
Boughter, J.	Sensory coding in taste DC000353	NIH	09/01/85 07/31/09	\$261,500
	Genetic Dissection of a Motor Central Pattern Generator NS052366	NIH	01/15/07 12/31/08	\$162,340
Callaway, J.	Dendritic role in dopamine neuron firing NS42276 No Cost Extension	NIH	03/01/02 02/28/08	\$179,506
Cantrell, A.	Ion channel dysfunction in Huntington's disease R01NS46885	NIH	09/01/03 08/31/08	\$180,154
Chaum, E.	Automated Screening for Diabetic Retinopathy by Content-based Image Retrieval	NEI *UT/ORNL collaboration	09/30/05 08/31/08	\$663,632
	Electrochemical Quantification of Strum Propofol Levels for Target Controlled Infusion Anesthesia Army Contract W81XWH-05-2-0064	US Army	05/25/05 11/19/08	\$156,514

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	Plough Fund Diabetes Retinopathy Grant	Plough	08/14/07 08/13/10	\$332,118
	UTRF Maturation Program Grant	UTRF	02/01/08 10/31/08	\$15,000
	Training, Access, Education and Management for a Life That's Sugar-Free (TEAM Sugar-Free)	Proprietary Study	09/01/07	\$56,418
	Molecular Responses to Oxidative Stress in the Retinal Pigment Epithelium: Validation of Antioxidant Effects on RPE Gene Expression	Proprietary Study	01/22/08 01/21/09	\$97,386
	Community Foudantion-930 Friends	Community Foundation	05/16/08 12/31/47	\$50,000
Chesler, E.	Ontological Discovery for Ethanol Research	NIH	02/15/07 01/31/10	\$119,067
Desiderio, D.	Chiesi Farmaceutici	Contract	03/30/07 03/29/10	\$619,844
	Cornell Subcont	Contract	09/01/07 08/31/08	\$94,113
Dohan, C.		Bachmann Family		\$50,000
Dong, H.W.	Acitivity-Dependent Plasticity of Sensory Synapses in the Olfactory Bulb DC-009049	NIH	07/01/07 06/30/10	\$50,000
Dopico, A.	Ethanol actions on SLO channels from arteries vs. brain AA011560	NIH	01/01/99 03/31/09	\$193,340
	Nongenomic bile acid on smooth muscle BK channels HL077424	NIH	05/01/04 04/30/09	\$222,915
Dragatsis, I.	Establishment of conditions for extended survival & evaluation of therapeutic effects of Tocotrienols in a mouse model	The Dysautonomi Foundation	07/01/07 12/31/07	\$78,261
	Generation of a mouse model for Familial Dysautonomia NS 050376	NIH	07/01/05 04/30/08	\$100,000

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	Role of NGF in Familial Dysautonomia	NIH	04/01/08 03/31/12	\$218,750
Ennis, M.	Metabotropic glutamate receptors in the olfactory bulb DC-003195	NIH-NIDCD	01/08/07 12/31/11	\$209,738
	Computational and experimental analysis of noradrenergic function in early sensory processing DC008702	NIH-NIDCD	07/01/06 06/30/11	\$126,056
Foehring, R. C.	The role of inhibition in shaping neocortical activity in normal and <i>fmr1</i> knock out mice 5R07HD05724-01 *Co- Principal Investigator with D. Heck	NIH	12/01/07 11/30/09	*-----
Geisert, E.	Vision Center Research Fund	Private Donor	01/15/03 01/14/13	\$50,000
	Modulators of Retinal Injury-R01EY017841	NEI	09/01/07 08/31/08	\$250,000
Hamre, K.	Mapping Cerebellar Development in Time and Space HD-052472	NIMH	09/01/05 08/01/10	\$564,188
	Evaluation of Stereocilia Morphology in genotypically Math 1 Null cells in Chermic Mice	Deafness Research Foundation	12/01/08 12/01/09	\$12,000
	SBIR (Phase II) Mouse Transcriptomic Fingerprints as biomarkers for chronic alcohol abuse	NIAAA	10/01/07 09/01/09	\$102,643
	SBIR (Phase I) Development of NIAAA Correlational Database	NIAAA	10/01/07 09/01/08	\$17,911
	Mouse Research Core AA016666	NIAAA	02/01/08 01/31/09	\$65,260
Homayouni, R.	Role of Dab2IP in Brain Development	NIH	08/01/06 07/31/10	\$215,430
Heck, D.	Use of dynamic photostimulation to investigate synaptic integration in vivo 5R21MH073915-02	NIH	07/01/07 06/30/09	\$157,500

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	The role of inhibition in shaping neocortical activity in normal and fmr1 knock out mice 5R07HD05724-01 *Co-Principal Investigator with R. Foehring.	NIH	12/01/07 11/30/09	\$50,000
Herron, P.	Enhancing Teaching with knowledge of neuroscience	Urban Child Institute	11/01/06 12/31/08	\$750.00
Honig, M.	NS-34404 Sensory Axon Pathfinding	NIH	07/01/07 06/30/08	\$218,151
Iannaccone, A.	Infrastructural Support for CNTF Trials NNR GR NN-NG-CK-0407-0015-NP	Proprietary Donor	01/15/03 01/14/13	\$25,000
	Career Development Award	RPB	01/01/06 12/31/08	\$50,000
	Epidemiology of Carotenoids Inflammation and Genetic Markers in Age-Related Macular Degeneration	IRRF (International Retinal Research Foundation)	01/01/08 12/31/08	\$175,074
	Age Related Eye Disease Study II Clinical Center Award Subcontract	Proprietary Study	06/01/06 02/28/08	\$7,632
Jaggari, J.	Mitochondrial regulation of calcium signaling	NIH	03/11/05 02/28/09	\$213,341
	Calcium Signaling in Cerebral Arteries 2R01HL067061-06A2	NIH	04/01/01 03/31/13	\$225,000
	Calcium Signaling in Cerebral Arteries 3R01HL067061-06A2S1	NIH	04/01/01 03/31/13	\$47,708
	Solamere QLC100 Nipkow Spinning Disk Confocal Unit	NIH	05/01/07 04/30/08	\$229,690
Johnson, D.	Core Grant for Vision Research 2 P30 EY13080	NEI	04/01/05 03/31/10	\$369,664
Kita, H.	Synaptic Transmissions in the Basal Ganglia NS-057236	NIH	04/01/08 03/30/09	\$255,500
	Rhythmicity and Synchrony in the Basal Ganglia NS-36860	NIH	07/01/07 06/30/08	\$237,647

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	Physiology and Anatomy of the Basal Ganglia NS-42762	NIH	12/01/05 11/30/08	\$222,178
LeDoux, M.	Mutant Gene Ident in the Dystonic Rat NS-048458	NIH	02/01/08 01/31/09	\$192,759
	Tetrahydroisoquinolines and Parkinson's Disease NS - 49123	NIH	04/01/06 03/31/08	\$108,738
	Molecular foundations of the Myoclonus-Dystonia Syndrome NS- 50185	NIH	06/15/06 05/31/08	\$73,000
	Schwarz Bioscience SP792	Clinical Trial	07/07/05 12/31/07	\$78,347
	Schwarz Bioscience SP793	Clinical Trial	05/26/06 05/25/08	\$50,050
	Univ Rochester SubAmarin	Contract	04/01/05 01/31/08	\$48,228
	Univ Rochester HP Therap	Clinical Trial	07/01/05 06/30/08	\$91,400
	Xenoport-XP053	Clinical Trial	09/01/06 08/09/09	\$190,862
	Xenoport-XP055	Clinical Trial	01/10/07 10/31/08	\$101,800
	Wolfe Neuropathy Grant	Grant	12/29/06 12/31/08	\$100,000
	INC MERZ 60201-0433	Clinical Trial	02/09/07 02/05/12	\$79,690
	INC MERZ 60201-0408	Clinical Trial	02/09/07 02/05/12	\$89,250
	Dystonia Medical Res	Grant	04/15/08 04/04/09	\$40,000
	Mass Gen Hospital	Contract	12/01/07 11/30/08	\$170,000
Leffler, C.	Control of neonatal circulation HL034059	NIH	04/01/85 03/31/12	\$250,000
	Carbon monoxide in newborn cerebral circulation HL042851	NIH	08/16/91 07/31/10	\$237,045
Lemon, C.	Gustatory Neural Coding in Mice: Connecting Taste Receptors to the brain DC-008194-02	NIH	04/01/07 03/31/08	\$48,550
	Orosensory Contributions to Alcohol Ingestion	NIH	07/01/07 04/30/08	\$51,213

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Levin, M.	Comm Fdn MS Res	Grant	08/31/06 08/30/10	\$300,000
Lu, L.	Genetic Analysis of Theanol-Mediated Stress Reduction AA-014425-04	NIH	01/01/07 05/31/08	\$408,359
McDonald, M.	Michael J. Fox Fdn	Grant	10/31/07 10/01/08	\$75,000
	Am Health Asst Fdn	Grant	04/01/07 03/31/08	\$73,764
	Am Health Asst Fdn	Grant	04/01/08 03/31/09	\$75,000
Malik, K.	Angiotensin-prostaglandins adrenergic interactions HL019134	NIH	09/01/77 03/31/13	\$409,312
	Lipid/lipoprotein metabolism and cardiovascular disease HL007641	NIH	07/01/88 06/30/09	\$187,565
	Ecosanoids-induced Vascular Growth During Injury HL079109	NIH	01/01/05 12/31/09	\$237,045
Matta, S.	Gestational drugs and nicotine self-administration DA015525	NIH	04/01/03 03/31/09	\$213,340
Miller, D.D.	Novel Irreversible Nonsteroidal SARMs for Prostate Cancer	NIH	08/15/03 08/01/08	\$252,960
	Pharmacology of Nonsteroidal Androgen Receptor Ligands	NIH	09/01/05 08/31/09	\$62,279
	Study of Phospholipid Growth Factor Receptors	NIH	09/01/06 08/31/11	\$250,000
	Discovery of Novel Dual Action Cytotoxic Agents for Advanced Melanoma	NIH	03/01/08 02/30/10	\$150,000
Nelson, R.	Modulation of Primate Somatosensory Cortical Responses	NIH	04/01/07 03/31/12	\$209,563
Pfeiffer, R.	Univ Rochester NS37167	Contract	09/01/99 01/31/08	\$26,200
	Univ Rochester NS050095	Contract	09/01/05 12/31/07	\$31,200
	Univ Rochester NS0046487	Contract	05/01/06 04/30/08	\$92,580
	Novartis Pharm ELC200	Clinical Trial	12/01/04 04/30/09	\$110,108

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	Novartis Pharm CHTF919E	Clinical Trial	03/30/06 12/30/07	\$26,800
	IND-Inspect	Clinical Trial	01/27/05 01/26/08	\$82,080
	Boehringer Ingel 248-538	Clinical Trial	02/17/05 12/31/10	\$490,900
	Boehringer Ingel 248-595	Clinical Trial	10/10/06 11/09/08	\$107,469
	PharmaNet 6002US025	Clinical Trial	01/11/06 12/31/10	\$62,738
	Columbia Univ NS036630	Contract	05/01/06 04/30/08	\$7,452
	EISAI Quintiles E2007-303	Clinical Trial	07/26/07 09/30/09	\$109,136
	EISAI Quintiles E2007-302	Clinical Trial	12/01/06 12/31/08	\$103,062
	Schwarz Biosciences	Clinical Trial	10/18/07 12/31/10	\$130,710
	I3 Res-Ingelix Pharm	Clinical Trial	03/18/08 12/31/10	\$171,373
Reiner, A.	Behavioral and Histological Assessment in R6/2 Mice of The Efficacy of The Group 2 Metabotropic Glutamate Receptor Agonist Ly379268 for Treating Huntington's Disease.	High Q Foundation	01/01/07 12/31/07	\$150,000
	Role of Striatal Parvaluminergic Neurons in Dystonia in Huntington's Disease	HDF	06/01/07 05/31/08	\$50,000
	Organization of the Cortical Projection to the Basal Ganglia NS057722	NIH	06/01/07 05/31/09	\$220,000
	Neuropathology And Pathogenesis Of Huntington' Disease NS057722	NIH	07/15/90 03/31/09	\$250,000
	Organization of the Cortical Projection to the Basal Ganglia EY-005298	NIH	03/01/08 02/28/13	\$218,750
Reiter, L.	Cure Autism Now	Grant	02/11/07 08/10/08	\$60,000

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	Autism Speaks	Grant	12/15/07 12/15/08	\$60,000
Rex, T.	Hope For Vision Award – Rex - Young Investigator’s Award	Scheie Eye Institute	07/05/07 06/30/09	\$38,055
	Analysis of rhEPO processing in mouse tissue-implications for gene therapy of retinal degenerations	RoRAR (The Roche Foundation for Anemia Research)	07/01/07 06/30/09	\$75,131
Senogles, S.	D2 Dopamine Receptor Activation Leads to Anti- Proliferation in a Small Cell Lung Cancer Cell Model	NIH	06/01/07 05/31/08	\$173,074
Sharp, B.	Interaction Between Nicotine and Stress DA003977	NIH	03/31/85 12/31/09	\$285,603
	Opiate Receptor-Mediated Effects of Stress on Immunity DA004196	NIH	09/30/86 06/30/09	\$287,047
Steinle, J.	Role of Beta-Adrenergic Receptor Agonists in Therapies for Retinopathy	JDRF- Juvenile Diabetes Research Foundation	01/01/06 03/31/11	\$136,364
	Effects of Loss of Sympathetic Nerve Activity on Normal Ocular Aging	NIH	09/30/06 08/31/08	\$92,586
Steketee, J.	Cortical Mechanisms of Cocaine Sensitization DA023215	NIH	07/01/08 05/31/13	\$200,000
Tavalin, S.J.	Regulation of Ionotropic Glutamate Receptors NS046661	NIH	05/15/05 05/31/09	\$153,486
Timmons, S.	Traumatic Brain Injury	NIH	07/01/07 06/30/09	\$365,990
	VCU Subcont –Solvay	Clinical Trial	06/30/08 12/31/09	\$29,800
Waters, R.	Fetal alcohol exposure and sensori- motor cortex function AA013437 No cost extension	NIH	08/01/03 07/31/09	\$195,300
	Brainstem gustatory processing DC000066	NIH	04/01/90 06/30/09	\$308,467

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	Mechanisms of Large-scale Reorganization in Rat Forepaw Barrel Subfields Cortex NS-055236	NIH	05/01/07 04/30/11	\$175,000
Watsky, M.	Development of an artificial innervated cornea for safety and efficacy testing	Univ. of Ottawa	05/01/07 07/01/10	\$103,988
Williams, R.	Human brain project: Informatics center for mouse neurogenetics DA-021131-08	NIH	07/01/00 08/31/10	\$815,799
	Striatal and Neocortical Transcriptomes	High Q Foundation	01/01/06 12/31/07	\$385,972
	INIA: Robust Systems Genetics of Alcohol and Stress Effects on CNS	NIH	02/05/02 12/31/12	\$189,803
	Integrative genetics of cancer susceptibility CA 105417	UNC/NIH	08/15/04 03/31/08	\$82,247
	Mouse BIRN RR-021760	NIH/UCLA	04/01/05 03/31/08	\$176,636
	Eli Lilly Contract	MEM MED	12/14/07 12/31/09	\$207,475
	Helmholtz Center Contract		10/01/07 09/30/08	\$49,000
Yoo, T.	Immune responses in tubulin induced hearing loss in mice DC005010	NIH	07/01/03 06/30/09	\$150,998
Zhang, Y.H.	Elucidating the Neural Substrate of Taste Analgesia HD-057601-01	NIH	01/20/08 12/31/09	\$50,000
Zhou, F.M.	Voltammetric analysis of striatal dopamine dynamics MH067119	NIH	03/03/04 01/31/09	\$162,343
	Non-transporter cocaine mechanisms in dopamine system DA021194	NIH	09/30/07 06/30/11	\$196,000
	Regulation of basal ganglia output neurons NS058850	NIH	09/30/08 08/31/13	\$185,625
Total				\$19,428,808

APPENDIX 2
Faculty Publications and Society for Neuroscience Presentations
FY 2007-08

1) Peer-reviewed publications for 2007-08 (cited in PubMed):

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- Lemon, C**. Stimulus selectivity of central gustatory neurons: variations through time. *Neuroscience Abstract, 2007.*
- Lester, DB, Miller, AD, Dickson, PE, **Mittleman, G**, and Blaha, C. Effects of acute muscarinic receptor blockade on cocaine's ability to enhance laterodorsal tegmentum stimulation-evoked dopamine release in the nucleus accumbens. *Neuroscience Abstract, 2007.*
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- Pani, AK, Pond, B, Jiao, Y, Alele, P, and **Smeyne, RJ**. Alterations in monoamine levels in the brain of methylphenidate treated mice. *Neuroscience Abstract, 2007.*
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- Xu, L, George, EO, Berry, MW, **Goldowitz, D**, and **Homayouni, R**. Analysis of functional coherence of gene sets by Latent Semantic Indexing of MEDLINE abstracts. *Neuroscience Abstract*, 2007.
- Yang, X, **Kita, H**, and **Callaway, JC**. Effects of Zonisamide on SNc dopamine cells in rat brain slices. *Neuroscience Abstract*, 2007.
- Yu, G, Chen, H, **Matta, S**, and **Sharp, B**. Effects of chronic nicotine self-administration on corticotropin-releasing hormone and arginine vasopressin mRNA expression and on c-Fos induction by a novel stressor in the hypothalamic paraventricular nucleus. *Neuroscience Abstract*, 2007.
- Zhao, Y, and **LeDoux, M**. Genetic, motoric and morphological analysis of DYT1 Δ GAG transgenic mice. *Neuroscience Abstract*, 2007.

APPENDIX 3
Neuroscience Seminar Speakers
FY 2007-08



FALL 2007 NEUROSCIENCE SEMINAR SERIES

12:00 Noon

Link Auditorium

Steve Tavalin, Ph.D.

September 11, 2007

Assistant Professor

Department of Pharmacology

UTHSC

TITLE: "A CaMouflaged kinase regulates AMPA receptors"

Kathleen Millen, Ph.D.

(Dr. Dan Goldowitz, host)

September 18, 2007

Assistant Professor

Department of Human Genetics

The University of Chicago

Chicago, IL

TITLE: "Congenital Cerebellar Malformations Reveal Novel CNS Developmental Mechanisms"

Jonathan Jaggar, Ph.D.

September 25, 2007

Associate Professor

Department of Physiology

UTHSC

TITLE: "Mitochondrial Regulation of local and global arterial Ca²⁺ signals: Mechanisms and Functional Consequences"

Edwin J. Weeber, Ph.D.

(Dr. Larry Reiter, host)

October 2, 2007

University of South Florida

Department of Molecular Pharmacology and Physiology

Tampa, FL

TITLE: "Serendipity in Science, Insights into Angelman Syndrome"

Steven C. Fowler, Ph.D.

(Dr. John Boughter, host)

October 9, 2007

Professor

Department of Pharmacology & Toxicology

University of Kansas

Lawrence, KA

TITLE: “Pharmacological induction and manipulation of rhythmic behavioral (e.g., licking, tremor, stereotype) in rats and mice”

John Martin, Ph.D. (Dr. Robert Waters, host) October 16, 2007

Professor
Columbia University
Doctoral Program in Neurobiology & Behavior

TITLE: “Reshaping Corticospinal Connections to Promote Motor Recovery After Brain Injury”

Dmitri “Mitya” Chklovskii, Ph.D. (Dr. T. Schikorski, host) October 23, 2007

Group Leader
Howard Hughes Medical Institute
Janelia Farm Research Campus
Ashburn, VA

TITLE: : “What Determines the Shape of Dendrites?”

Jack Lilien., Ph.D. (Dr. Monica Jablonski, host) October 30, 2007

Professor & Chair
Department of Biology
University of Iowa
Iowa City, IA

TITLE: “Integrating Signaling Form Axon Guidance Cues and Adhesion Molecules”

James Surmeier, Ph.D. (Dr. Bob Foehring, host) November 20, 2007

Professor and Chair
Department of Physiology
Northwestern University
The Feinberg School of Medicine
Chicago, IL

TITLE: “Calcium, Selective Vulnerability and Parkinson’s Disease”

Timothy J. Ebner, M.D., Ph.D. (Dr. Detlef Heck, host) November 27, 2007

Professor & Head
Department of Neuroscience
Visscher Chair in Physiology
University of Minnesota
Minneapolis, MN

TITLE: “Probing Cerebellar Function and Dysfunction: Electrophysiological and Optical Imaging Studies”

Robin AJ Lester, Ph.D. (Dr. FuMing Zhou, host) December 4, 2007

Associate Professor
Department of Neurobiology
University of Alabama @ Birmingham
Birmingham, AL

TITLE: “Central Nicotinic Receptors: Fast Channels – Slow Synapses”

John Boughter, Ph.D.
Assistant Professor
Department of Anatomy & Neurobiology
UTHSC

December 11, 2007

TITLE: "Dissection of a Central Pattern Generator"

SPRING 2008 NEUROSCIENCE SEMINAR SERIES

12:00 Noon

Link Auditorium

Bradley E. Alger, Ph.D.
Professor
Department of Physiology
School of Medicine
Baltimore, MD 21201

(Matt Ennis, host)

January 15, 2008

Title: Endocannabinoids in the hippocampus: Regulation and Roles

Steve Lisberger
Department of Physiology
UCSF, Box 0444
San Francisco, CA 94143-0444

(Detlef Heck, host)

February 5, 2008

Title: Variation, Signal, and Noise in Sensory-Motor Processing

Alex Dopico, Ph.D.
Associate Professor
Department of Pharmacology
University of Tennessee Health Science Center

February 12, 2008

Title: "Variation, Signal, and Noise in Sensory-Motor Processing"

Jena Steinle, Ph.D.
Assistant Professor
Department of Ophthalmology
University of Tennessee Health Science Center

February 26, 2008

Title: "Role of Beta-Adrenergic Receptor Signaling in Diabetic-Like Retinal Pathology"

Steven A. Thomas, M.D., Ph.D.
Associate Professor
Dept of Pharmacology
School of Medicine
Philadelphia, PA

(Jena Steinle, host)

March 4, 2008

Title: "Preservation of Hippocampus-dependent Memory Retrieval by Norepinephrine during Stress"

Eberhard E. Fetz, Ph.D. (Grad Students, host) March 25, 2008
Professor (Tara Toleman)
Physiology & Biophysics
Washington National Primate Research Center
University of Washington Seattle, WA 98195-7290
Title: “Volitional Control of Neural Activity and Brain-computer Interfaces”

Julie A. Kauer, Ph.D. (Steve Tavalin, host) April 1, 2008
Professor
Dept. of Molecular Pharmacology, Physiology and Biotechnology
Providence, RI 02912
Title: “Novel Role of TRPV1 in Depressing Hippocampal Synapses”

Shaun Morrison, Ph.D. (Clark Blatteis, host) April 15, 2008
Neurological Sciences Institute
Oregon Health & Science University
Beaverton, OR 97006
Title: “The Feedforward Reflex arc for Sympathetic Thermogenesis in Cold Defense”

David S. Weiss, Ph.D. (Fu-Ming Zhou, host) April 29, 2008
Chair, Department of Physiology
University of Texas Health Science Center at San Antonio
San Antonio, TX 78229
Title: “Structural Rearrangements Underlying GABA Receptor Activation”

Javier Stern MD PhD (Bill Armstrong, host) May 6, 2008
Associate Professor
Department of Psychiatry
University of Cincinnati
Cincinnati, OH
Title: “Decoding intrinsic and cell-cell communication mechanisms regulating neuronal activity in CNS preautonomic neurons”

APPENDIX 4
Neuroscience News
FY 2007-08

Ophthalmic Genetics: Bridging Basic and Clinical Frontiers

Thursday, May 8th
10:00 am - 2:00 pm
Freeman Auditorium,
Hamilton Eye Institute
Third Floor, 930 Madison Avenue
Memphis, Tennessee



J. Fielding Hejtmancik, MD, PhD

Section Chief, Section of Ophthalmic Molecular Genetics
National Eye Institute, Bethesda, MD

**“Barbados Family Study of Glaucoma:
Recent Progress”**

Philip J. Horner, PhD

Assistant Professor of Neurological Surgery
Graduate Program in Neurobiology and Behavior
University of Washington

**“Progressive ganglion cell degeneration:
Role of oxidative stress and glial activation”**

Simon W. M. John, PhD

Senior Staff Scientist and Investigator
Howard Hughes Medical Institute, Chevy Chase, MD
The Jackson Laboratory, Bar Harbor, ME

**“Understanding the mechanism of glaucoma
through DBA/2J mice”**



Hamilton Eye Institute
Clinical and Translational
Science Institute



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER



**Clinical and Translational
Science Institute**

“Overview of Diagnosis and Treatment of Alzheimer’s Disease”

**A Public Lecture
Presented by**

Pierre Tariot, M.D.

**Banner Alzheimer’s Institute
Phoenix, Arizona**

**Monday, March 10th
6 - 7 PM**

**IMAX Auditorium
Pink Palace Museum
3050 Central Avenue
Memphis, TN**

5:30 PM - Refreshments

Following the presentation,



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER



Clinical and Translational
Science Institute

Translational Neuroscience Symposium

Alzheimer's Disease

Tuesday, March 11th

1 - 5 PM

Freeman Auditorium, Hamilton Eye Institute

Third Floor, 930 Madison Building

Memphis, TN

Alex Auchus, M.D.

Professor of Neurology, UTHSC

**“Neuroimaging Research in Alzheimer’s Disease
and Related Disorders”**

Mike McDonald, Ph.D.

Professor of Neurology, UTHSC

“Gangliosides and Neurodegenerative Disorders”

Pierre Tariot, M.D.

Banner Alzheimer’s Institute

Phoenix, Arizona

“Current and Future Treatment of Alzheimer’s”

Benjamin Wolozin, M.D., Ph.D.

Professor of Pharmacology

Boston University School of Medicine

**“Pharmacoepidemiology: Identifying Neuroprotective
Strategies for Alzheimer’s Disease”**



Brain Imaging and Its Use in Developmental Disorders



When

Thursday, March 13, 6:30 – 8:30 pm

Where

The Urban Child Institute 600 Jefferson Ave.

This program for the general public will feature two presentations on two powerful, non-invasive methods to visualize the brain of children with developmental disorders. Dr. Mark McManis of the University of Tennessee Health Science Center and LeBonheur Children's Hospital will talk about magnetocephalography and Dr. Robert Ogg of St. Jude Children's Hospital will speak about functional magnetic resonance imaging. These methods enable new opportunities for understanding and treating neurological conditions like autism, ADHD, epilepsy, traumatic brain injuries, and brain tumors. Dr. William E. Armstrong, Director of the University of Tennessee Neuroscience Institute, will moderate the program.

This program is directed toward parents, teachers, and health professionals. Professional training hours (CEUs) will be provided by the UT Neuroscience Institute. For more information, contact Dr. Paul Herron, UT Neuroscience Institute (448-5824). Space is limited. Please pre-register with Ms. Brenda Williams, The Urban Child Institute (526-1822; bwilliams@theurbanchildinstitute.org). Attendance is free.

Refreshments from 5:30-6:30 pm



**Plug Into
Neuroscience!**

Brain Awareness Week Discusses New Views

Brain Awareness Week was a great success in March as more than 200 teachers, parents and health care professionals attended a symposium on neuroimaging use in developmental disorders at the Urban Child Institute in Memphis.

The evening began with a brain exhibit provided by the Department of Pathology and Laboratory Medicine that consisted of displays of healthy human brains and brains damaged by disease such as stroke, meningitis and brain cancer.

The symposium, co-sponsored by UTHSC Neuroscience Institute and the Urban Child Institute, was an effort by the Neuroscience Institute to present advances in what neuroimaging can tell us about developmental disorders.

William E. Armstrong, PhD, director of the Neuroscience Institute and acting chair of the Department of Anatomy and Neurobiology, moderated the symposium. The featured presentations were by Mark McManis, PhD, assistant professor of pediatrics and clinical director of the MEG at Le Bonheur Children's Medical Center, who discussed new views into brains, as well as what is being learned about causes of developmental disorders, and Robert Ogg, PhD, associate member of radiological sciences at St. Jude Children's Research Hospital, who spoke on what new views into the brain tell us about developmental disorders. The symposium was coordinated by Paul Herron, PhD, of the UTHSC Neuroscience Institute, and Brenda Williams of the Urban Child Institute.



Pictured Left: Dr. Robert Ogg and Dr. Mark McManis address new views on the brain during brain awareness week.



Pictured Below: The Department of Pathology and Laboratory Medicine displays an exhibit on brain disease.

SICK LEAVE BANK OPEN ENROLLMENT

The annual open enrollment period for the Sick Leave Bank is April 1 to June 30. The Sick Leave Bank provides paid leave to bank members who have exhausted all of their leave due to a personal illness or injury. If you would like a better understanding of what the Sick Leave Bank is and what it has to offer, you may attend the Sick Leave Bank class by registering online at <http://www.utmem.edu/hrtraining/>.

ELIGIBILITY

Employees must:

- Be classified as regular, full time or part time and be in an active pay status, which allows accrual of sick leave.
- Have a balance of at least 48 sick leave hours as of June 30.
- Agree to a one-time assessment (donation) of 24 hours of sick leave for full-time employees. Part-time employees' assessments will be pro-rated based on the percentage of time assigned to work.

TO ENROLL

Enrollment forms are available online at <http://www.utmem.edu/hr/Benefits/sick.htm>.

Forms should be completed and returned to Human Resources Benefits, 910 Madison Avenue, Suite 727, or via fax to 448-7497. For additional information, employees may contact the HR Benefits Department at 448-5601.



UT Medical Group Germantown Pediatric Echocardiography Lab Earns Accreditation

The echocardiography laboratory at the Germantown office of UT Medical Group, Inc., has been accredited by the Intersocietal Commission for the Accreditation of Echocardiography Laboratories, making it and the echo lab at Le Bonheur Children's Medical Center the only accredited pediatric echo labs in the region.

Echocardiography is a painless procedure that uses sound waves to provide an up-close look at the heart. The images enable doctors to detect congenital heart defects such as valve problems and structural abnormalities.

The accreditation process ensures that echo labs meet stringent practice standards. Facilities must meet continuing education requirements and show that they have a standard reporting system, a quality assurance program, and an approved echocardiogram protocol.

Cindy Plowman, technical director for the UT Medical Group Germantown pediatric echo lab, says more than 800 transthoracic echocardiograms are performed at the facility each year. The lab is located in UT Medical Group's office at 7945 Wolf River Boulevard in the "Camp Pediatrics" second floor suite. Vijaya Joshi, MD, is the medical director of cardiovascular services. For more information, call (901) 448-2020.

Carpool Connection

In light of rapidly increasing gas prices, a carpool connection site has been created on the UTHSC Bulletin Board.

If you are interested in carpooling, please go to the site to either leave your contact information or collect data for your use.

Please remember that anyone with Web access can view the bulletin board so do not enter data that you want to keep private. You can access the bulletin board at the following address:

<https://oracle.utmem.edu/pis/htmldb/prd/f?p=193206:1:4068574602808196>.

You can also navigate to the site by going to the main UTHSC Web page at www.utmem.edu. On the left side of the page, click on "Bulletin Board," located at the end of the left column. To post items you must login by entering your net id and password.



Undergraduate Neuroscience Merit Scholar, Indre Agustinaite of Christian Brothers University, presents a poster of her work “Sucrose Induced Analgesia in the Brainstem of Neonatal Rat Pup” with NI member Matthew Ennis, Ph.D., at the 12th Annual CBU Student Research Poster Session.

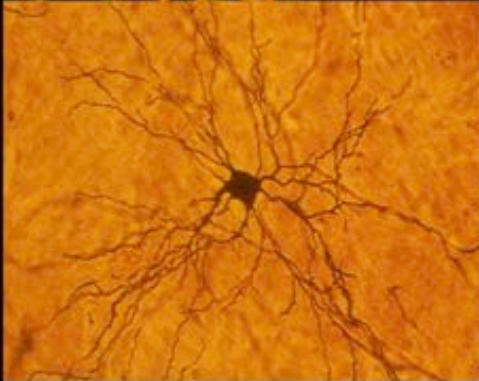
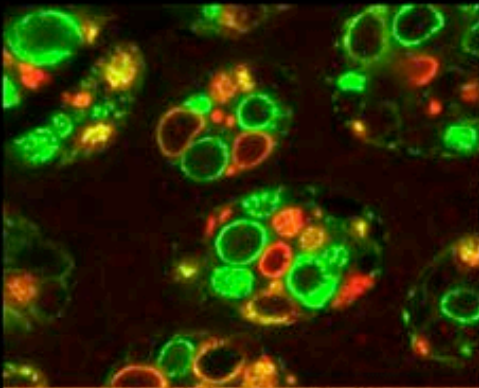


THE
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**St. Jude Children's
Research Hospital**
ALSAC • Danny Thomas, Founder

Graduate Studies in Neuroscience



Neuroscience Studies at the University of Tennessee Health Science Center are a part of a multidisciplinary and interdepartmental program including the Departments of Anatomy and Neurobiology, Molecular Sciences, Pathology, Pharmacology, and Physiology. This program provides a broad background in neuroscience and specific research training in neurochemistry, neurophysiology, neuropharmacology, molecular and cellular neuroscience, developmental neurobiology, and behavioral neuroscience, leading to the Ph.D. degree.

Established in 1985, the multidisciplinary Neuroscience Institute houses over 80 faculty from several departments and colleges at UT. The faculty hold positions in the departments of Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pharmaceutical Sciences, Pharmacology, Physiology, Surgery, and Biomedical Engineering. Some faculty members also hold primary appointments at St. Jude Children's Research Hospital, just a short distance away.

UT Neuroscientists focus on research dealing with neurological and neurodegenerative disorders, excitable properties of neurons and synaptic function, sensory information processing, brain tumor biology, vision and retinal biology, neurogenetics and neural development, neuropharmacology of mental and addictive disorders, and intracellular signaling in neurons. UTHSC is one of the world's leading centers exploiting novel genomic approaches to explore brain development, CNS function and behavior, and psychiatric and neurodegenerative diseases.

Graduate Studies in Neuroscience

To apply for the Neuroscience Track, please go to the Integrated Program in Biomedical Science (IPBS) website.

<http://www.utmem.edu/grad/IPBS>

To find out more about the program, please visit our website.

<http://www.utmem.edu/neuroscience>

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APPENDIX 5

**Call for Applications and Award Notices
Basic and Clinical Neuroscience Pilot Grants**



Neuroscience Institute (NI) Pilot Program For Collaborative Grant Applications

Goal: The NI solicits the submission of proposals for collaborative, multidisciplinary neuroscience research. Such grant applications may involve 3 or more investigators who plan to submit an application for an NIH PPG, NIH Center, or similar research ensemble (e.g., large R01 with non-modular budgets of >\$350,000/yr) focused on a coherent research theme. The PI and at least one collaborator must have active NIH funding.

Method of Support by NI: The NI will primarily provide funds for personnel or a crucial piece of equipment, and some additional funds for supplies. Support will be for a maximum of 2 years for any one group. A progress report must be submitted after each year of funding, and "UTHSC Neuroscience Institute/Center of Excellence" acknowledged in any publications relevant to support. These publications should be forwarded to NI.

Types of Grant Application Eligible for Consideration of NI Support:

1. **Preliminary:** Committed research team of established PIs who meet NIH criteria for a successful application; early stage research hypotheses/concepts and committed funding from the research team to obtain preliminary data;
2. **Advanced:** NIH Institute indicates a commitment to the grant and to a level of NIH funding that can be requested by the applicants;
3. **An Advanced Concept with a first set of positive critiques** from an NIH review panel requesting additional preliminary data prior to resubmission.

NI Funding Levels: Groups may request up to \$40,000 for the first year of support. The amount awarded will depend on the budget justification and the number of quality applications. A second year of support will be determined by the progress report (including NIH review) and availability of funds.

NI Application for Support:

1. Two page application that identifies the PI and other key personnel, a brief description of the project and its current status (e.g., preliminary, advanced, etc), and the intended category of application (e.g., large R01, P01, P30, P50).
2. Each investigator involved in the project should also supply a current NIH format biosketch that includes current funding.
3. Itemized budget with justification.
4. For advanced concept (#3 above), the NIH review should be submitted with application.

Review Process: The NI Executive Committee will review applications; a brief, written summary will be sent to the corresponding PI.

Deadline: Jan. 14, 2008. More submission dates may be announced in early 2008. Submit electronic (PDF) copies to:

William Armstrong, Ph.D.
Director, Neuroscience Institute
Email: warmstrong@utmem.edu
Phone: 901-448-5966



Neuroscience Institute (NI) Pilot Program For Clinical Neuroscience

Goal: The NI solicits the submission of proposals from clinical neuroscientists for funds to collect pilot data for grant applications to NIH.

Method of Support by NI: The NI will primarily provide funds for support personnel (*i.e.*, technicians, coordinators, students, post-docs, etc.) or a crucial piece of equipment, and some additional funds for supplies. A progress report must be submitted after each year of funding, and "UTHSC Neuroscience Institute/Center of Excellence" acknowledged in any publications relevant to support. These publications should be forwarded to NI.

NI Funding Levels: Individuals may request up to \$50,000 for the first year of support. The amount awarded will depend on the budget justification and the number of quality applications. A second year of support will be determined by the progress report (including peer review) and availability of funds.

NI Application for Support:

1. Two page application that identifies the PI and other key personnel, a brief description of the project and its current status (*e.g.*, is the project nascent, or is their a grant in submission, revision, etc.) and the intended or current category of application (R01, R21, R34, etc.).
2. *The project should include at least one basic scientist co-investigator with strong research experience.* The Pi and each investigator involved in the project should supply an NIH format biosketch that includes current any current or previous funding.
3. Itemized budget with justification.

Review Process: The NI will review applications and make awards on a meritorious basis. A brief, written summary will be sent to the corresponding PI.

Deadline: Mar. 21, 2008. Submit electronic (PDF) copies to:
William Armstrong, Ph.D.
Director, Neuroscience Institute
Email: warmstrong@utmem.edu
Phone: 901-448-5966