



Center for
**BIOMEDICAL
NEUROSCIENCE**



About the University of Texas Health Science Center at San Antonio

The University of Texas Health Science Center at San Antonio, one of the country's leading health sciences universities, ranks in the top 3 percent of all institutions worldwide receiving federal funding. Research and other sponsored program activity totaled a record \$231 million in fiscal year 2011. The university's schools of medicine, nursing, dentistry, health professions and graduate biomedical sciences have produced approximately 28,000 graduates. The \$736 million operating budget supports eight campuses in four cities: San Antonio, Laredo, Harlingen and Edinburg. For more information on the many ways "We make lives better@," visit uthscsa.edu.

Mission

The mission of the CBN is to enhance and promote multidisciplinary neuroscience at the Health Science Center, to address the major challenges in our field.

Strategic Priorities

Increase neuroscience research excellence at the HSC by developing multidisciplinary and translational collaborations, and facilitate the acquisition of multi-PI research grants, program project grants, training grants, center grants and other large collaborative grants

Enhance neuroscience education and training on our campus

Engage the CBN membership in outreach, community, and cross-institutional activities

Establish a network of robust philanthropy for the neurosciences at the Health Science Center.

Promote the national and international reputation of CBN programs and members

Welcome and History

Welcome to the Center for Biomedical Neuroscience at the University of Texas Health Science Center at San Antonio! The growth and development of Neuroscience as a discipline at the UTHSCSA paralleled the growth of Neuroscience on the national stage. The 1990's were declared the Decade of the Brain by President George Bush, and in that decade, membership in the Society for Neuroscience doubled, from 13,000 to nearly 30,000 members. In the early 1990's, UTHSCSA in its strategic plan had established the goal to develop neuroscience as an area of excellence. This was an ambitious goal, as there was, prior to that time, very little neuroscience research at this institution. Over the next decade, several new chairs were recruited into key clinical and basic science departments who were neuroscientists themselves, and who then recruited a large cadre of new neuroscience faculty, both junior and senior, into their respective departments, including Pharmacology, Physiology,



Center for Biomedical Neuroscience Steering Committee

David Morilak, Ph.D.,
Director

Robin Brey, M.D.,
Chair, Department of Neurology

Pedro Delgado, M.D.,
Chair, Department of Psychiatry

Peter Fox, M.D.,
Director, Research Imaging Institute

Alan Frazer, Ph.D.
Chair, Department of Pharmacology

Randy Glickman, Ph.D.,
Department of Ophthalmology

Kenneth Hargreaves, D.D.S., Ph.D.
Chair, Department of Endodontics

David Jimenez, M.D.,
Chair, Department of Neurosurgery

Manzoor Bhat, Ph.D.,
Chair, Department of Physiology



Biochemistry, Psychiatry, Neurology, Neurosurgery, Endodontics and the Research Imaging Center. As these departments consolidated and interacted, a critical mass was emerging in this growing community of basic and clinical neuroscientists, and a formal mechanism was needed to create and maintain a sense of cohesion for this community, and to provide a programmatic entity with which our neuroscientists would affiliate and identify.

Thus, in 2001, the Center for Biomedical Neuroscience was formed to serve as an umbrella organization for all neuroscientists and neuroscience-related activities on our campus. The

mission of the CBN was clear—to enhance and promote all teaching, research and outreach activities related to neuroscience at the UTHSCSA. The CBN is led by a steering committee comprised of the leadership of all major neuroscience components on campus. Alan Frazer served as the first CBN director, from 2001-2009, succeeded by David Morilak in 2009. Following a strategic plan developed by the membership in 2009-2010, the CBN applied for and was granted formal Center status as an Organized Research Unit in the summer of 2012.

Today, the CBN has over 100 members from 5 basic science and 12 clinical

*Paula Shireman, M.D.,
Vice Dean for Research,
School of Medicine*

We have a tremendous opportunity to build upon the successes of our neuroscience research community, linking their discoveries to new diagnostics and treatments that can improve the health of our population. The Center for Biomedical Neuroscience is uniquely positioned to enhance collaborations between multiple disciplines, and to improve the translation of discovery to treatment through educational initiatives, pilot projects and seminars.



departments in the Medical School, Dental School, and Research Imaging Institute. It is a broadly inclusive organization serving a productive, diverse and collegial community of neuroscientists, representing the depth and breadth of the field, from membrane biochemistry and ion channel electrophysiology to neurochemistry, neuroanatomy, neuroendocrinology, systems neurobiology, neuroimmunology, behavioral neuropharmacology, neuroimaging and cognitive neuropsychology. These researchers study the causes and treatment of diseases of the brain including epilepsy, PTSD, traumatic brain injury (TBI), stroke, Parkinson's Disease, Alzheimer's Disease and other neurodegenerative diseases, substance abuse, schizophrenia, anxiety disorders, bipolar disorder, depression and suicide, chronic pain and more.

The CBN promotes the rational development of neuroscience on our campus; recruits high caliber graduate and post-graduate students; develops programs for education and professional development of trainees at all levels; increases public awareness of issues and research in neuroscience; and provides a focus at UTHSCSA for private and industrial donors interested in supporting this discipline. The CBN is the organization out of which the Graduate Program in Neuroscience was developed. The CBN funds collaborative pilot projects, sponsors an annual spring retreat, hosts world-class

**Alan Frazer, Ph.D., Chair,
Department of Pharmacology**

It is gratifying to see the growth of the discipline of neuroscience at our institution and I am honored to have played a role in this.



Diseases of the nervous system, particularly the central nervous system, collectively are among our most debilitating ones- and not only to the patient but to their families as well. Our Institution is now widely acknowledged as carrying out world-class research for many of these diseases, as evidenced in part by our very good research funding levels in these areas from NIH, DoD, the VA and foundations. And our educational programs for our students in these areas are now also first-rate. The CBN has been instrumental as the entity orchestrating these successful initiatives and is certainly deserving of its new status as an officially-recognized Organized Research Unit. The future is now bright on our campus for this important research area.

speakers and special lectures, promotes enrichment and outreach, including the Brain Bowl and other Brain Awareness Week activities.

Diseases of the brain and nervous system are among the most costly and debilitating, and among the most difficult to treat. It is hard to imagine anyone who has not been touched in

some way by the devastation wrought on individuals, families and communities by these diseases. Whether it is to understand the flow of ions across a cell membrane, or how these molecular events translate into the thoughts, emotions, aspirations and dreams of the human mind, there is no discipline more challenging or rewarding than the study of the brain, and no subject more complex. This is Neuroscience; this is the CBN!

**Mansoor Bhat, Ph.D., Chair
Department of Physiology**

The Center for Biomedical Neuroscience plays



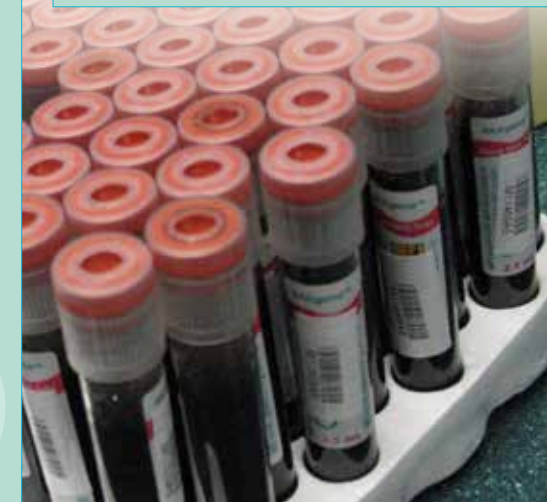
an important role in promoting research in cellular, molecular and developmental neuroscience at the Health Science Center. The CBN brings together neuroscientists with diverse research interests and expertise to foster close collaborations and create a nurturing environment for trainees and junior investigators. Another important mission of the CBN is to support innovative pilot projects to allow its members to develop new research areas through interaction and collaboration; and to garner extramural grant support to achieve greater success and visibility. In the coming years, the CBN is poised to advance translational neuroscience with a focus on human neuropathologies to alleviate or develop cures for debilitating neurological and neuropsychiatric disorders that affect individuals, their families and society.

**Ken Hargreaves, DDS, PhD, Chair,
Department of Endodontics**

Pain is the top reason that drives patients to seek health care providers, incurs more than \$500 billion in annual

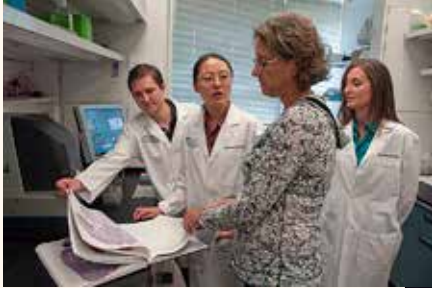


costs in the United States, and is 4-10 times more prevalent than cancer, diabetes, coronary heart disease or stroke. Building upon the neuroscience strengths at UTHSCSA, a group of PIs actively collaborate on basic and clinical pain research, resulting in new NIH grants, and training of PhD students and post-doctoral fellows. The CBN serves as an important foundation that encourages, organizes and facilitates clinical and translational neuroscience. Many of our collaborations and grants have in fact come out of the annual CBN retreat that provides a terrific opportunity to interact with other neuroscientists on our campus.



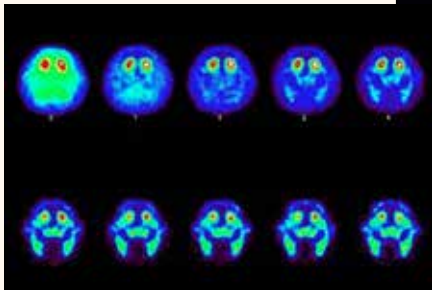
Age-related Neurodegeneration Research

Research on age-related neurodegenerative diseases, including Alzheimer's Disease, Parkinson's Disease, Amyotrophic Lateral Sclerosis (ALS) and stroke, focuses on mechanisms of neurodegeneration at the molecular, cellular and systems levels. The work brings together a large (currently >15) and growing number of researchers from several departments and centers, including the Barshop Institute for Aging and Longevity studies, the VA Neurodegeneration Research Center, the South Texas Research Facility, and the Departments of Cellular and Structural Biology, Physiology, Psychiatry, Neurology and Pharmacology. These researchers are using cutting edge techniques to understand the pathophysiology of these diseases with the aim of identifying strategies for prevention and treatment.



The Mood Disorders Translational Research Center

The Mood Disorders Translational Research Center was formed in 2008, and crystallized the following year around the funding of an ARRA P30 Center Grant for Faculty Recruitment in Translational Neuroscience that brought two new faculty members into the HSC Neuroscience community, in Pharmacology and Psychiatry. The purpose of the MDTRC is to promote translational collaborations in mood disorders research, with emphases on neuro-

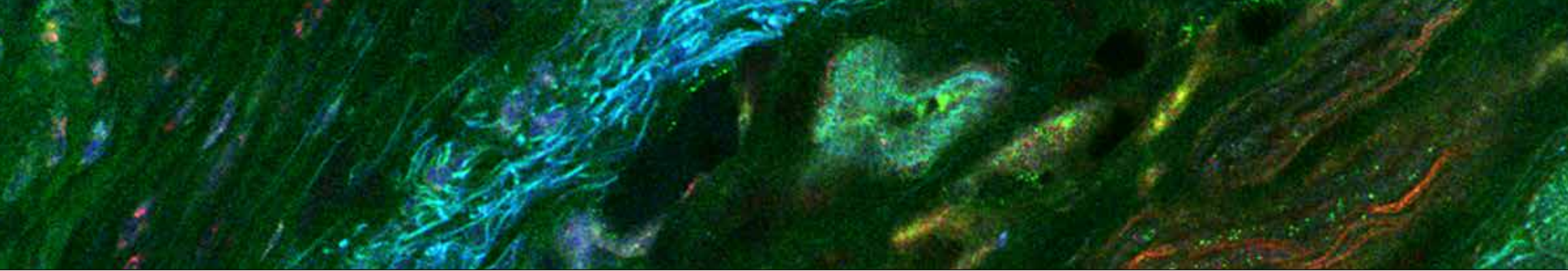


immune signaling, prefrontal cognitive function, and investigation of novel therapeutic mechanisms. Comprised of 16 principal investigators and members of their research teams, the group meets biweekly to discuss ongoing projects, recent advances in the field, approaches to modeling dimensions of psychiatric illness in animals, testing mechanistic hypotheses about etiology and treatment in patients, and developing concrete strategies for advancing fundable collaborative research projects. The members of the MDTRC also currently mentor 4 K-award trainees at various levels, from successful revision and resubmission of proposals to their transition into independent PI status. In 2012, members of the MDTRC submitted 8 collaborative translational pilot projects and full proposals, to both internal funding mechanisms as well as NIH, NARSAD, the American Foundation for Suicide Prevention, and the Department of Defense/CDMRP.

Pain Research Group

The Pain Group consists of seven collaborative research labs in the Medical and Dental Schools. Several important factors contribute to our scientific environment—thereby increasing the probability of research success—including: 1) physical proximity—our lab are contiguous with one another, greatly facilitating collaborative research interactions; 2) the Dental School has designated Pain Research as an officially recognized major thematic area and provides our group with institutional support; 3) for ~10 years, we have held a weekly pain journal club involving all of our labs comprising ~40 members, including PIs, PhD and dual-degree students, post-doctoral fellows and residents, providing a strong opportunity for continued development and interactions; and 4) four of our labs hold combined weekly lab meetings, permitting rapid feedback and fostering new collaborations among ongoing projects. Evidence for this synergy is well documented by our pain faculty serving as co-authors on papers and co-investigators on grants. The primary area of emphasis is on mechanisms regulating function of peripheral nociceptors. Primary methods range from molecular, biochemical, electrophysiologic, and behavioral preclinical studies to biochemical, genetic and efficacy clinical trials.





STRONG STAR Consortium for PTSD Research



The South Texas Research Organizational Network Guiding Studies on Trauma and Resilience, or STRONG STAR, is a multidisciplinary, multi-institutional research consortium funded by the U.S. Department of Defense Psychological Health and Traumatic Brain Injury Research Program to develop and evaluate the most effective early interventions possible for detection, prevention, and treatment of combat-related posttraumatic stress disorder (PTSD) in active-duty military personnel and recently discharged veterans. Under the leadership of the UTHSCSA and based in South-Central Texas, the STRONG STAR Consortium brings together more than 100 researchers and clinicians conducting a broad array of clinical, exploratory, and preclinical

trials to assess novel delivery methods of evidence-based PTSD treatments specially adapted to meet the unique needs of the military population. Simultaneously, the Consortium is striving to learn more about the causes of PTSD; the influence of comorbid physical and psychological ailments; and the interaction of cognitive-behavioral therapies and pharmacologic treatments. Ultimately, the Consortium is focused on reducing the suffering of our nation's wounded warriors, to help our returning warfighters to continue living healthy, productive lives and to prevent the development of chronic PTSD in a new generation of war veterans. See www.strongstar.org.

Research Group on Drug and Alcohol Abuse

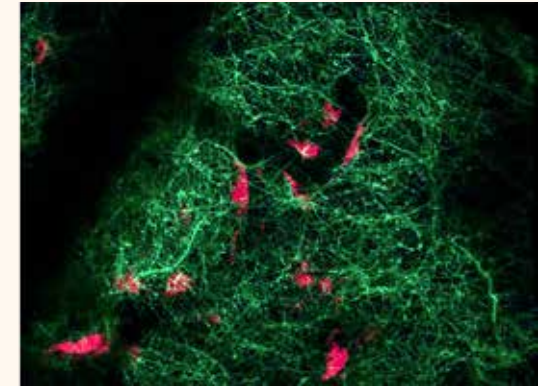


The 18 principal investigators involved in drug and alcohol abuse research

represent 4 departments and, collectively, are responsible for 28 grants from the National Institutes of Health (NIAAA and NIDA), including a T32 training grant from NIDA. The preclinical pharmacology group includes investigators and trainees from the Departments of Pharmacology, Physiology and Psychiatry. These highly collaborative researchers investigate a wide range of topics in the area of drug and alcohol abuse using a variety of species, techniques, and procedures. Currently funded projects investigate opioids, benzodiazepines, stimulants, nicotine, THC, and alcohol in experiments using mice, rats, pigeons, and other models. Regular group activities include twice weekly joint laboratory meetings; a twice monthly Addiction Journal Club; and a once monthly Addiction Seminar Series. Pre- and post-doctoral trainees attend monthly "chalk talks" presented by scientists from UTHSCSA and elsewhere as well as weekly seminars, grand rounds, and journal clubs.

STRF Neuroscience group

The South Texas Research Facility is a new, state of the art facility housing modern research laboratories organized in an "open lab" modular format, designed to easily adapt to the needs of highly collaborative, multi-disciplinary and thematically-focused biomedical research



groups. The STRF Neuroscience group is currently comprised of 10 existing independent research labs, with plans and capacity for new recruitment, and occupies approximately 20,000 sq ft of new laboratory space. A major collaborative research theme of the STRF Neuroscience group focuses on molecular and cellular mechanisms of neurodegeneration and functional pathology following brain injury, both in the context of neurodegenerative disorders such as Alzheimer's and Parkinson's disease, as well as in trauma, stroke, and epilepsy. Approaches ranging from human neurosurgery and genetics, to single ion channel electrophysiology, to mouse models of neurodegenerative diseases and stroke, to optical imaging and biophysics, and many more, are applied in a uniquely integrative, collaborative and translational body of complementary research projects.



Spring Research Retreat



In May, the CBN sponsors an annual Spring Research Retreat, a full-day scientific meeting on campus. All members of the Neuroscience community are invited to attend and present posters (55 posters were presented in 2012). Abstracts are published in a program booklet and anyone involved in research can present, including faculty, post-docs, residents, laboratory staff and graduate students. Especially for students, this serves as a valuable dress rehearsal for those planning to present at major national meetings. In addition to two poster sessions, there is a series of 20-minute talks given by CBN faculty, and a keynote presentation delivered by an invited external speaker of national and international prominence. This event is an annual celebration of both the scientific excellence and collegiality of our neuroscience community that everyone looks forward to and enjoys.



Brain Bowl

Every spring, the CBN sponsors the Brain Bowl, the premier Brain Awareness Week event for our neuroscience community. The Brain Bowl is a neuroscience quiz show in which three teams of undergraduates from colleges and universities across Texas compete for prizes, bragging rights, and the brain bowl trophy. The first brain bowl was held in 1998, and over the years has attracted teams from Texas Lutheran University, Saint Mary's University, UTSA, Trinity University, Southwestern University, University of Texas at Austin, University of Texas at Arlington, Baylor University, and Texas A&M. Graduate students, post-docs and faculty from the CBN run the event, serving as timers, scorekeepers, and judges. The Brain Bowl inspires spirited and fun competition from the participating teams, and a social

reception after the event provides a venue for networking between undergraduate students interested in neuroscience, along with their advisors and faculty mentors, with the neuroscience community here at the UT Health Science Center. Participation in the Brain Bowl is often a conduit to summer research experience, and subsequent application to our Neuroscience graduate program. The Brain Bowl has also been a vehicle for public awareness and outreach for our neuroscience community, as it has been featured in the local newspaper, on cable and broadcast television news spots, and in participating school news media. The Brain Bowl has been featured at the Society for Neuroscience Brain Awareness Week workshop, and has become a signature event of the CBN.

Lectures

The CBN sponsors several talks and lectures throughout the year, including a Distinguished Neuroscientist Lecture Series and several seminars of broad interest to the HSC community. The CBN also sponsors two special talks in the Neuroscience seminar series, a Graduate Student-hosted speaker in the fall, and a Resident-hosted speaker in the spring.



The CBN is proud to sponsor the Mariann Blum Memorial Lectureship in the Neurosciences. Dr. Mariann Blum, a beloved member of our neuroscience community, passed away prematurely in 2003 after a valiant struggle with brain cancer. "Poco" was a rising star in the field of Parkinson's Disease research. To remember her influence on young women in neuroscience, and her impact on neurodegeneration research, the CBN established a Memorial Lectureship in her honor, featuring prominent neuroscientists with strong roles in mentoring female trainees.



Graduate Program in Neuroscience

The Interdisciplinary Graduate Program in Neuroscience provides didactic education, intensive research training, and professional development for doctoral students pursuing their Ph.D. degree, as well as dual-degree students in the MD/Ph.D. and DDS/Ph.D. programs. Initially created by the CBN as an interdepartmental "emphasis" in 2003, the Neuroscience Graduate Program formally became a "track" within the Integrated Multidisciplinary Graduate Program in the Graduate School of Biomedical Sciences in 2008. With 26 students and over 50 training faculty from 5 basic science departments and 8 affiliated clinical departments or divisions within the medical and dental schools, we emphasize a flexible program of study and research tailored specifically to the individual needs and interests of each student. The Neuroscience Graduate Program offers a rich curriculum and research training opportunities that spans the breadth and depth of Neuroscience, from molecular, cellular, and neurochemical to systems, behavioral, cognitive and clinical research. Enrichment activities that complement the formal course work and laboratory research of our students include special interest research groups; student-led journal clubs and whiteboard sessions; a vibrant seminar series and several special lectures given by prominent visiting neuroscientists; an intensive clinical practicum experience in Neurosurgery, Neurology or

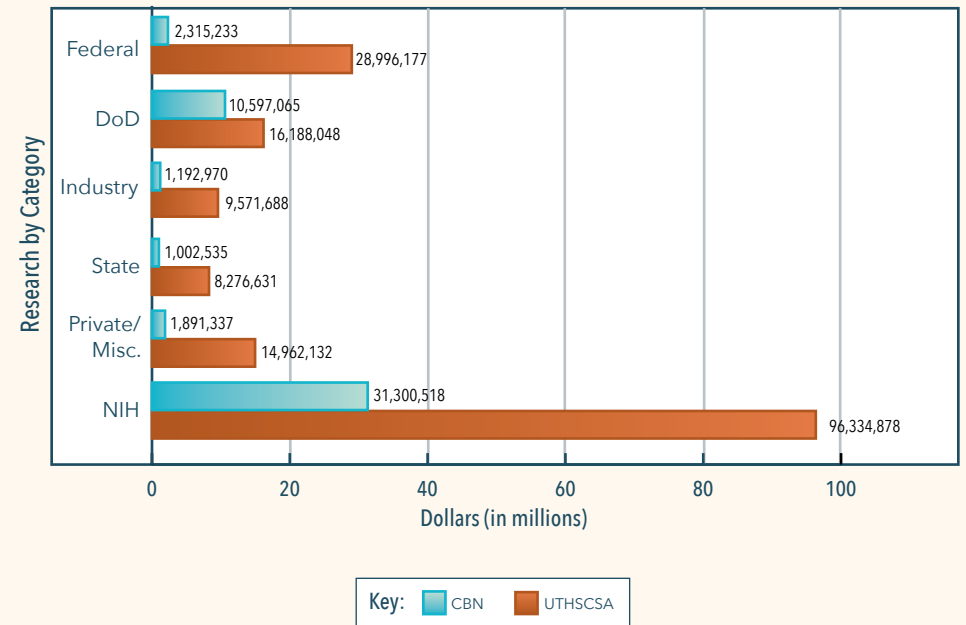
Psychiatry; an annual retreat; membership in the Society for Neuroscience and other professional societies; attendance and presentation at local, state, national and international meetings; participation in Brain Awareness week activities; and several social functions held throughout the year. Our program is active in the local chapter of the Society for Neuroscience and in the Texas Academy of Science. Our program has achieved a national profile as a member program of the Association of Neuroscience Departments and Programs (ANDP), then with the merger of ANDP into the Society for Neuroscience, as one of the original Institutional Program members of the SfN Neuroscience Departments and Programs. Our students have been very successful in obtaining NRSA individual research fellowships from the NIH, and students receiving their Ph.D. degrees in the Neuroscience Program have obtained outstanding post-doctoral positions and gone on to successful careers in Neuroscience. For more information, please visit the Neuroscience Graduate Program web site: <http://www.uthscsa.edu/neuroscience/>

In 2012, 70 members of the CBN attended the Society for Neuroscience meeting in New Orleans to present their research, including 21 faculty, 20 graduate students, 12 undergraduate research fellows, and 17 post-docs and other trainees

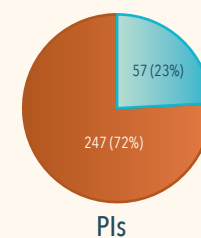
Funding

The members of CBN have been very productive and competitive for funding, both from the NIH, the gold standard for biomedical research funding in our country, as well as from the Department of Defense, the Veterans Administration, private foundations and industry. As the graphs below illustrate, the members of CBN bring in a disproportionate amount of research funding to the UT Health Science Center. Specifically, the 57 members of CBN who received NIH funding in FY11 represent 23% of all NIH-funded investigators at the HSC. But the CBN investigators brought in 32% of total NIH funding to the HSC. Likewise, considering all sources of research funding, 74 funded CBN investigators, representing 14% of the funded investigators at the HSC, brought in 28% of total research funding. In addition to traditional R01-type individual research grants, the CBN and its members have effectively obtained funding for Center Grants, Program Project Grants, Training Grants and K-awards, and our students and post-docs have been very successful in obtaining individual NRSA Fellowships (F-awards).

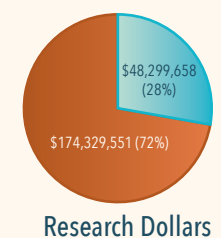
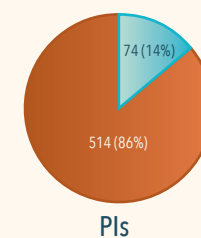
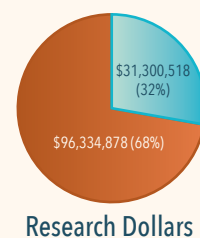
CBN Research at the Health Science Center

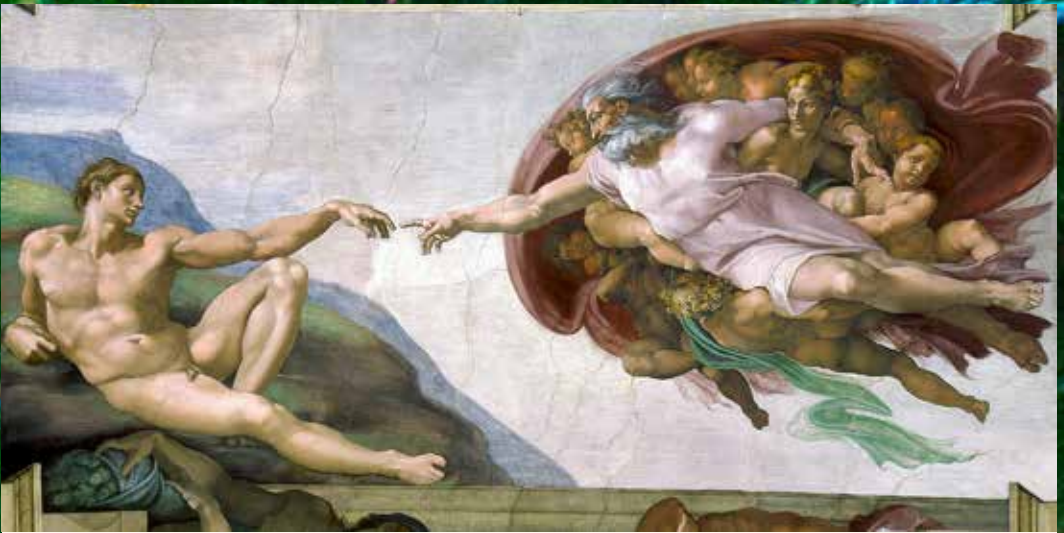


CBN NIH Funding

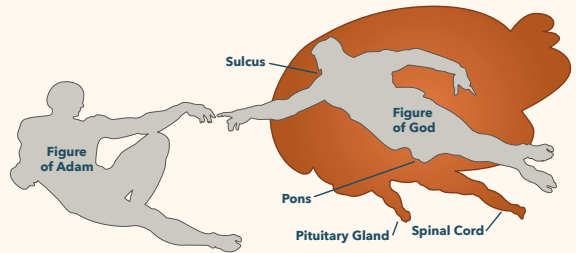


CBN Total Research Funding





The Creation of Adam (1508-1512) on the ceiling of the Sistine Chapel has long been recognized as one of the world's great art treasures. In 1990 Frank Lynn Meshberger, M.D. described what millions had overlooked for centuries—an anatomically accurate image of the human brain was portrayed behind God. On close examination, borders in the painting correlate with sulci in the inner and outer surface of the brain, the brain stem, the basilar artery, the pituitary gland and the optic chiasm. God's hand does not touch Adam, yet Adam is already alive as if the spark of life is being transmitted across a synaptic cleft*. Below the right arm of God is a sad angel in an area of the brain that is sometimes activated on PET scans when someone experiences a sad thought. God is superimposed over the limbic system, the emotional center of the brain and possibly the anatomical counterpart of the human soul. God's right arm extends to the prefrontal cortex, the most creative and most uniquely human region of the brain.



*Frank Lynn Meshberger, M.D., *The interpretation of Michaelangelo's Creation of Adam Basilar Neuroanatomy*, JAMA #14 October 1990

For more information

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