**FLORIDA ATLANTIC UNIVERSITY- HEALTH RELATED ASSETS**

**Overview**

Florida Atlantic University (FAU) is designated as a “High Research Activity” institution according to The Carnegie Classification of Institutions of Higher Education. In fiscal year 2020, the university received $63.2M in grant awards. In alignment with the University’s Strategic Plan (2015 – 2025), the university has outlined four “pillars” of research strength: human health and disease intervention, ***neuroscience***, ocean science/engineering, and ***sensing and smart systems***. These pillars represent focus areas that guide institutional goals and strategic actions, and they closely reflect FAU’s existing regional and national strengths, including its coastal location, diverse population, and neighboring research institutions. Inspired by the U.S. Brain Initiative, our neuroscience pillar I-BRAIN is an outgrowth of a core principle outlined in FAU’s 2015-2025 Strategic Plan: the *transformative potential of neuroscience* to unravel addiction, dementia, psychiatric illnesses, communication disorders, spinal cord injuries, and a host of other complex conditions. Collectively, I-BRAIN’s 100+ faculty and affiliates are creating a synergistic hub for neuroscience in South Florida that supports state-of-the-art research and innovative educational activities focused on neuroscience. Additionally, the Institute for Sensing and Embedded Network Systems Engineering (I-SENSE) Embedded Networking Laboratory provides access to more than 200 wireless sensing platforms, 300 platform peripherals, and a large collection of electronics components selected to support rapid prototyping of sensing systems. The laboratory also provides basic support for electronics prototyping and repair. Recognizing the university’s commitment to sharing research findings with its community, FAU recently received the Carnegie Designation for Community Engagement, an elective designation that indicates institutional commitment to community engagement. Several funded research experiences are also available for undergraduates, including an NSF-funded LEARN grant that develops research-based curriculum, an NSF-funded REU program that aims to diversify science by providing summer research for undergraduates around the country, and an NIH-funded URISE grant that fosters diversity in the emerging biomedical workforce. Also, dedicated to continuing student success, the Graduate College works closely with academic colleges, graduate students, and graduate faculty to offer advanced degrees in 73 master’s, 5 specialist, and 25 doctoral degree programs. Within the Florida State University System, FAU students rank second for percentage of graduates employed in the state of Florida at the master’s level (82%) and third at the doctoral level (18%).

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**FAU Research Infrastructure**

**FAU investigators can rely on a well-managed infrastructure to support their research efforts**. The Division of Research (DoR) assists investigators with a range of administrative support needs -- from proposal submission to post-award accounting to technology commercialization -- through the following offices:

* **Research Development** spearheads the initial planning, conceptualization, and writing process leading to a grant award, including helping investigators assistance in finding research funding, building cross-discipline university-wide teams and providing feedback on grant proposals.
* **Research Integrity** manages a number of programs to ensure safety and promote objectivity in research, including the human research protections program, the animal care and use program, the diving and boating safety program, the conflict of interest committee, and the biosafety program.
* **Comparative Medicine** oversees a centralized animal care and use program staffed by a full time Attending Veterinarian, a Clinical Veterinarian, and highly skilled, certified technical staff. The program is newly accredited by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC).
* **Research Communications** promotes research and scholarly activity at the university by disseminating news and information about FAU research to internal and external audiences through a variety of channels. In addition, the office supports FAU researchers, informing them about the division’s services, programs, events and regulatory changes that may impact their research. Research Communication also regularly hosts a “Communicating Your Science” workshop for faculty.
* **Technology Development** manages intellectual property (IP) created by faculty and students at FAU to support the creation and commercialization of novel ideas. The office provides impartial consultation on various legal protection and commercialization strategies, and collaborates with outside attorneys and consultants to offer additional resources. Additionally, the office works closely with the Office of Sponsored Programs to structure the IP and commercial provisions of sponsored research agreements.
* **Postdoctoral Affairs** provides mentoring, career advising, funding resources, and training on skills such as effective grant writing, scholarly presentations, teaching, and communication. The goal is to equip postdoctoral fellows with the skills and knowledge to make them successful in their chosen career path.

**FAU Space and Facilities**

Located on the southeast Florida coast, FAU spans six campuses from Broward County to St. Lucie County and has more than 37,000 students. The FAU main campus in Boca Raton consists of 700 acres and 236 buildings; 94 of its acreage is set aside for nature conservation and the protection of its symbolic “burrowing owl.”

Operating in this multi-county service region, investigators are able to take advantage of an array of facilities. The College of Science awards Ph.D. degrees in six different departments (*i.e*., Biological Sciences, Chemistry, Geosciences, Mathematical Sciences, Physics, Psychology). Within the College of Science, the Department of Biological Sciences offers a biomedical science concentration, providing faculty and trainees with several core facilities to advance their research, including a High-Performance Computing (HPC) cluster capable of performing intense computing tasks at a fraction of the cost and a fluorescent-activated cell sorter for analyzing cellular properties. The Department of Chemistry & Biochemistry offers mass spectrometry, NMR, and peptide synthesis services. The College of Medicine awards M.D., M.D.-Ph.D., Ph.D., and Master’s in Biomedical Science degrees. Having received LCME accreditation in 2015, the College of Medicine is recognized as the fastest rising medical school in Florida according to the recent U.S. News and World Report. Within the College of Medicine, the Departments of Biomedical Science and Integrated Medical Science conduct bench to bedside research in neuroscience, healthy aging, substance use disorders, and genomics & precision medicine. In support of their research, the College of Medicine houses several core facilities, including: (1) an AAALAC-accredited animal facility for developing pre-clinical animal models; (2) an Induced Pluripotent Stem Cell (iPSC) Facility for performing genome editing and iPSC differentiation; (3) a Molecular Facility for quantifying nucleic acids and performing expression analyses; (4) a Proteomic Facility for performing proteomics analyses and related quantitation; (5) a Cell Analytics Facility for fluorescent- or impedance-based technologies to sort and evaluate properties of both fixed and living cells; and (6) a Genomics Facility for next generation sequencing and genome modification analyses.

The ***College of Nursing*** is recognized nationally and internationally for its innovative approaches to nursing research, scholarship, and education within a caring philosophy. The College creates a context for learning that respects and celebrates the interconnectedness of people and their environments and prepares nurses to deliver exemplary interprofessional health care in a multi-cultural society, including urban and rural under-served areas. The College of Nursing research focus areas include healthy aging across the lifespan, health equity, holistic health, and transforming healthcare environments. A cluster of researchers in the College focus on healthy aging across the lifespan, examining conditions such as Alzheimer’s Disease, heart failure, and other aging/lifespan health concerns. These research efforts have capitalized on several unique features of FAU’s environment, such as the high number of older adults living in the local geographic area, the college’s affiliation with the Louis and Anne Greene Memory and Wellness Center (MWC), situated on FAU’s Boca Raton campus, and representation in two of the four university-wide pillars (I-HEALTH and I-BRAIN).

Nursing investigators also pursue health promotion and disease prevention through research that aims to improve nutritional practices, reduce risky behaviors to prevent HIV, and increase genetic testing for breast cancer. Furthermore, FAU’s location, in diverse Southeast Florida and in close proximity to the Caribbean and South/Central America, has enabled FAU nursing researchers to access multicultural populations and work to address health disparities among underserved populations, such as immigrant Afro-Caribbean communities and African American and Latino women.

The Office of Nursing Research and Scholarship(ONRS) employs a tenure-track biostatistician who assists nursing researchers with methodological design, statistical analysis, and management and merging of large data from multiple databases. The ONRS statistician has an active role in grant submissions and his work is complemented by statisticians from the College of Education and Business as well as those from the university-wide Biostatistical Core (see below).

The ***College of Engineering & Computer Science*** provides access to numerous specialized computing laboratories for engineering students, the majority of which are located within the Engineering East building. The specialized computing laboratories include (1) Experimental Methodology, (2) Microprocessor, Logic Design & Microcontroller, (3) Signal Image & Video Processing, (4) Digital Signal Processing, (5) Mobile Computing, Sensor & Wireless, (6) Empirical Software Engineering, (7) Bioinformatics, and (8) Microwave & Satellite Communications. These university facilities are centrally supported and funded through the Office of Information Technology. Engineering facilities receive additional support through the college’s Technical Services Group. The college manages two fully loaded and functional machine shops (see details under **Equipment**). Project personnel and participating students have access to the I-SENSE laboratories, spanning approximately 4,000 square-foot of space. The Innovation Laboratory provides access to more than 200 wireless sensing platforms, 300 platform peripherals, and a large collection of electronics components selected to support rapid prototyping of sensing systems. The laboratory provides end-to-end support for integrated software engineering, hardware engineering, and mechanical engineering. Personnel and participants are well-equipped to engage in small-volume device production and testing.

The ***College of Social Work & Criminal Justice*** has garnered regional and national acclaim for research and outreach initiatives on cyberbullying, substance abuse, violence, and the effects of climate change and sea-level rise. The College incorporates two schools, **Phyllis & Harvey Sandler School of Social Work** and the **School of Criminology and Criminal Justice.** The **Phyllis & Harvey Sandler School of Social Work’s** research scholars address some of the most significant social problems our society confronts, led by three research centers: the Healthy Aging Academy, the Child Welfare Institute, and a center focused on addiction recovery education and research.The Healthy Aging Academy was established to develop competent eldercare leaders and practitioners to meet growing aging population needs.The Child Welfare Institute partners with public and community-based child welfare agencies in Florida to professionalize the child welfare workforce. The Institute does this by extending the Sandler School of Social Work’s existing research, service, training, and education efforts in child welfare, as well as securing new grants and contracts for these efforts.The Research Centerfor addiction recovery, education and research was established toact as a center of addiction treatment research for the South Florida region. The Center’s goal is to mobilize knowledge in the broader community regarding addictions and addiction treatment services, through social media engagement, workshops, and other activities for social work and allied disciplinary practitioners in addiction. A new Certified Addictions Professional Certificate program was launched in Fall 2020 to train social work and related professionals for direct practice in addictions treatment.The School **of Criminology and Criminal Justice** focuses on timely social issues such as human trafficking, gang violence, addiction, white-collar crime and crimes of the powerful, the innovative uses of “drug courts” as an alternative to traditional judicial mechanisms, restorative justice, and the effects of cyberbullying on children.

**FAU Cores & Services**

**FAU Clinical Research Unit (CRU).** The Clinical Research Unit (CRU) provides the tools, training and guidance to properly conduct clinical research. The CRU’s dedicated staff of research professionals are skilled in several aspects of clinical research, including study startup, project coordination and regulatory oversight. The CRU staff includes an experienced clinical research physician, project leaders and study coordinators to provide human subject’s research protection and regulatory assistance. In addition, the facility is staffed with a fully credentialed, basic life support certified registered nurse and a certified/registered medical assistant. The nursing team members are skilled in advanced assessment, phlebotomy, administration of various routes of medication, audiometry, electroencephalogram, and pulmonary function testing. In the initial phases of investigator-initiated research studies, the unit along with the Biostatistics Core, provides support on study design, biostatistics, epidemiology and health services research consultation.

The CRU, located on the Boca Raton campus, is 8000 sq ft, has four exam rooms, two private cognitive/consultation rooms and a waiting room for participants and family members with complimentary computer workstations. The CRU includes 3 infusion suites with individual Welch Allyn Spot Vital Signs Monitors with pulse oximeter, 4 fully equipped exam rooms, and 2 rooms for private cognitive testing, The CRU equipment includes: DEXA machine for anthropometric measurements., OCT- Cirrus Essential (Zeiss), Spirometer-Pneumotach, InBalance Videonystagmography/Diagnostic system (VNG3000), FallTrak II Humac balance (VNG system), BTE Technologies Eval Tech Functional Testing System, In Body 770, In Body stadiometer (BSM 170), and Prokinetics ZenoMetrics – Zenomat. The unit has a Pharmacy space designed to safely store and deliver drugs utilized in clinical trials. The CRU laboratory is equipped with two -80 freezers, -20 freezer, Follett Refrigerator, biosafety cabinet, and three centrifuges: Horizon 653V, RPM 3-303, Centrifuge, Eppendorf AG 5702R, Centrifuge, Thermo Scientific.

By December 2022, an MR facility will be developed adjacent to the CRU. It will house a research focused GE Signa Premier 3T scanner and be equipped for simultaneous EEG and MRI. The GE scanner will include flexible and lightweight 30 channel AIR anterior array coil, 21 channel large multipurpose and 20 channel multipurpose AIR coils, a table-embedded 60 channel posterior array coil, and a 48 channel head coil, which allows for advanced functional MRI scanning. Additionally, an MR compatible EEG system including a 64 channel BrainCap-MR and 64 channel BrainAmp MR plus, designed to work with 3T MRI scanners or as individual systems will be available. To aid in simultaneous EEG and MRI acquisition, fibrotic cables, a synchronizing complex and trigger box kit for BrainAmp will be available. The MR Facility will be supported by an MR technologist and CRU staff for paradigm development, scheduling. MRIs will be performed at this scanner for this work.

REDCap is a secure web application for building and managing online surveys and databases. Provided by the FAU Office of Information Technology (OIT) and sponsored by the Division of Research, Research Electronic Data Capture (REDCap) provides electronic data capture services to researchers, faculty, employees and students. REDCap can be used for sensitive data. Qualtrics is a provider of survey solutions. FAU now maintains a license for Qualtrics to conduct online surveys. All administrators, faculty, staff, and students have access to use the software using their FAU Net ID and password once they create their account.

**FAU Biostatistics Collaborative Core.** The FAU Biostatistics Core (BCC) provides access to high quality biostatistics support to investigators involved in health-related research. The BCC is led by Katherine Freeman, D.P.H., an expert in the design and statistical analysis of multicenter randomized clinical trials (RCT) and observational studies. Dr. Freeman is also proficient in hierarchical modeling, survival analysis including multi-event methods, and meta-analysis for screening and other study designs. She has written or coauthored several successful NIH and foundation supported research grant applications for which she has been the Principal or Co-Investigator. Dr. Freeman is supported by a team of eight key research faculty from such areas as biostatistics, epidemiology, health economics, psychometrics, big data analytics, and computational biology. The BCC also provides workshops to new and seasoned investigators on a range of topics. Topics include introductory biostatistics, study design, epidemiology (framing a research question, causality, confounding), screening, reliability, clinical trial design and reporting, graphics, systematic reviews/meta-analysis, multiple linear and logistic regression modeling, hierarchical models, single and recurring event, survival models, statistical genetics, computational biology, and communication of statistical findings.

**FAU Neurobehavior Core**

The FAU Neurobehavior Core is contained within space in buildings MC-17 and MC-19, with FAU Comparative Medicine colony housing in adjacent rooms in each building, facilitating transport of mice from housing to the behavior rooms. Behavioral tasks and equipment and facilities available are listed below. Behavioral tasks not included in the list may be considered in consultation with the Behavior Core.

**Behavioral Procedures:**

**Gross neurological exam (Irwin screen):** The screen involves assessment of physical appearance, sensory and motor responses, spontaneous behavior in a novel environment. Reflexes such as righting, touch escape, trunk curl, reaching, are also assessed.

**Somatosensory.** Touch Test sensory evaluator kit (Von Frey filaments) are available as a test of somatosensory perception Shock threshold analysis is performed automatically when using other behavioral tests involving administration of electric shock.

**Motor coordination.** Available tests include rotarod, pole climb, grip strength meter, and inverted screen, and treadmill, which assess balance, coordination, and grip strength.

**Equipment:**

* **Med Associates 5-lane rotarod**; with computer workstation and analysis software.
* **SDI animal grip strength.** Includes gauge and testing stand with adjustable mesh grip.

**Startle/sensorimotor gating.** Acoustic startle response (ASR), prepulse inhibition, habituation, and fear-potentiated startle are available. Sensorimotor gating is impaired in many neurological disorders, including autism and schizophrenia.

**Equipment:**

* **SDI SR-Lab Startle Response System**; 4-chamber startle system, including PC and analysis software, and components to provide tones, lights, air puffs, background noise and foot shock.

**Locomotor activity.** Exploratory locomotor activity is measured in open field. Infrared beams and detectors automatically record horizontal activity and rearing in the open field. Habituation and sensitization of locomotor activity, repetitive movements, and other behaviors are also measured. In addition, the task provides measures of anxiety in response to a novel environment.

**Equipment:**

* **Med Associates activity monitors;** 8 chambers each in normal and reverse light cycle rooms with computer workstation and analysis software.
* **Med Associates activity monitors;** 4 chambers equipped with counter-balanced lever arm with tethers for concurrent open field activity and *in vivo* microdialysis in awake, freely-moving mice.

**Anxiety/Fear.** The light/dark exploration, elevated plus maze and marble burying tests of anxiety are available. In addition, measures of anxiety can be derived from the open field test, as described above. Conditioned freezing measures a state of fear/anxiety in response to threatening stimuli.

**Equipment:**

* **Med Associates activity monitors with light/dark inserts;** 8 testing chambers each in normal and reverse light cycle rooms.
* **Elevated plus maze.** There is a ceiling-mounted video camera for video recording and tracking/analysis with Noldus Ethovision software on a designated computer workstation.
* **Med Associates video fear conditioning.** 4 chambers connected to computer with analysis software, all located in an acoustic sound booth.

**Depression-related behaviors.** The Porsolt forced swim test and tail suspension test are available. These tests have predictive validity for drugs with antidepressant efficacy.

**Equipment:**

* **Med Associates tail suspension**, 4 units with computer workstation and analysis software.
* **Forced swim test.** There is a video camera for ceiling- or side-mounted video recording and tracking/analysis with Noldus Ethovision software on a designated computer workstation.

**Cognition.** Tests of learning and memory tests include Morris water maze, conditioned freezing, object and odor recognition, and Y-maze. Reward-based learning, such as 5-choice serial reaction time task, Go/No go task, and progressive and fixed ratio reward schedule tasks can be assessed in nose-poke and touchscreen operant chambers. These tests also provide measures of impulsivity and motor response inhibition. Additional tests may be designed.

**Equipment:**

* **Med Associates operant chambers** (6 chambers). These are nose-poke chambers with reward dispensers for use in a number of operant, rewarded tasks, Coupled with computer workstation and analysis software.
* **Lafayette touchscreen operant chambers** (12 chambers). Touchscreen operant chambers with reward dispensers can be used for a number of reward-based operant conditioning tests, including 5-choice serial reaction time task and go/no-go task. Coupled with computer workstation and analysis software.
* **Morris water maze**. Test spatial learning and memory. There is a ceiling-mounted video camera for video recording and tracking/analysis with Noldus Ethovision software on a designated computer workstation.
* **Med Associates video fear conditioning**, 4 chambers connected to computer with analysis software, all located in an acoustic sound booth.
* **Object and odor recognition**. Four high-walled square and 2 high-walled cylindrical open field arenas are available for these tasks. Two arenas can be used simultaneously for object and odor recognition. There is a ceiling-mounted video camera for video recording and tracking/analysis with Noldus Ethovision software on a designated computer workstation.
* **Y-maze.** There is a ceiling-mounted video camera for video recording and tracking/analysis with Noldus Ethovision software on a designated computer workstation.

**Social behavior.** Three-chamber social interaction test and the tube test for social dominance are available. An incubator for maternal separation is available.

**Equipment:**

* **Incubator.** Thermostat controlled and includes temperature chart recorder.Available for maternal separation studies.
* **Three-chamber social interaction.** Two chambers are available for use with video recording and tracking/analysis with Noldus Ethovision software.
* **Tube test.** Four tube test apparatuses are available, two with modification for use with concurrent optogenetics.

**Drug abuse**. Conditioned place preference is available to assess the reinforcing properties of drugs. Operant drug discrimination tests and the assessment of drug effects on schedule-controlled behavior are available.

**Equipment:**

* **Med Associates activity monitors with conditioned place preference inserts**; 8 testing chambers each in normal and reverse light cycle rooms with computer workstation and analysis software.
* **Med Associates operant chambers** (6 chambers). These are nose-poke chambers with reward dispensers for use in a number of operant, rewarded tasks, Coupled with computer workstation and analysis software.
* **Lafayette Touchscreen operant chambers** (12 chambers). Touchscreen operant chambers with reward dispensers can be used for a number of reward-based operant conditioning tests, including 5-choice serial reaction time task and go/no-go task. Coupled with computer workstation and analysis software.

**Neurochemistry and Behavior Resources**

***In vivo* microdialysis:** The Core is equipped with 4 Med Associates activity monitors equipped with counter-balanced lever arms with tethers for concurrent open field activity and *in vivo* microdialysis in awake, freely-moving mice and 3clear animal containers with counter-balanced lever arms with tethers for *in vivo* microdialysis in awake, freely-moving mice. Samples are collected with an inlineprogrammable Eicom Microdialysis Fraction Collector (FC-90) for up to 4 mice at once with refrigerated chamber using 96 well plates.

**High-performance liquid chromatography:** Eicom HTEC-510 HPLC-ECD System includes Pulse-less HPLC pump and electrochemical detector in line with AS-700 Eicom INSIGHT Autosampler, 2 x 96 well plate capacity for microdialysis and tissue monoamine and amino acid quantification controlled by a Windows PC with Envision Data System (EPC-700) software.

**Additional resource description:** In total, the Core has 5 Noldus Ethovision XT licenses under a NoldusCare service contract that includes updates to the most recent version of the software.

**Reverse light cycle housing and testing.** A colony room in the vivarium (Comparative Medicine housing) is permanently set on a reverse light cycle and is contiguous with a procedure room equipped with a hood for tagging and tailing and Behavior Core testing rooms for open field monitoring, light/dark test, conditioned place preference and touchscreen and nose-poke operant behavior.

**Procedure rooms.** There is an additional procedure room, containing stainless steel procedure benches, animal weighing scales, two syringe pumps, approximately 15 Hamilton Syringes.

**Surgical suite.** Room overseen by FAU Comparative Medicine equipped for isoflurane anesthesia and stereotaxic surgery for intracranial cannulae implantation. The Core performs cannulae implantation for microdialysis sample collection.

**Nikon Center of Excellence Cell Imaging Core (FAU/College of Medicine)**

The Cell Imaging Core occupies approximately 800 sq ft of dedicated research space in buildings MC-17 and MC-19 on the Jupiter campus, and another 200 sq ft of dedicated space in the College of Medicine, Boca Raton campus. The Core is overseen by Managing Director Dr. Jana Börner and Scientific Director Dr. Qi Zhang. Dr. Börner oversees all Core equipment and provides users with training and assistance on instrumentation and associated software. The Core houses two Nikon confocal microscopes (Nikon N-SIM E and A1+R combined Super Resolution and Confocal Imaging System) with associated computers for instrument operation and data collection, a Nikon 2 photon microscope, three in house designed imaging platforms for acute and chronic imaging of cells and brain slices, along with two dedicated image analysis workstations. Additionally, the Core provides access to an Olympus BX51 microscope with Optronics MicroFire camera, motorized stage and Neurolucida Software. The Core also includes a Carl Zeiss Microimaging LSM 700 Confocal Laser Scanning System. Lastly, a Keyence automated microscope is present for routine image capture of fluorescent and brightfield staining experiments. Three additional Core-associated Nikon confocal imaging platforms are located within FAU Jupiter laboratories as dedicated instruments but can be accessed through arrangements with associated investigators. Collectively, these facilities have been designated as a Nikon Center of Excellence, affording FAU Investigators with access to state-of-the art imaging platforms, training opportunities for junior scientists, evaluation opportunities of new imaging technologies, and reduced cost service and purchases. The Center of Excellence benefits from excellent support by Nikon specialists.

**FAU Comparative Medicine Core**. The animal care and use program at Florida Atlantic University is centralized and directed by a full-time veterinarian, trained in laboratory animal medicine and board certified by the American College for Laboratory Animal Medicine (ACLAM). The veterinarian is supported by a Training Coordinator to fulfill the federal mandate of training all personnel participating in handling, care and experimentation involving animal models. In addition, the animal care program employs an Animal Care Supervisor and several Animal Care Technicians who are certified by AALAS and take care of the daily operations in the various facilities. Health assessment is performed and documented for all animals 7 days per week.  A comprehensive rodent health surveillance program for monitoring pathogenic agents and animal well-being is in place for the animal care program. FAU is accredited by AAALAC International as of 2018, accreditation number 001742.  FAU has an Animal Welfare Assurance on file with NIH-OLAW, (Assurance Number A3883-01).  The FAU Animal Care and Use Program fully complies with the Guide for the Care and Use of Laboratory Animals (The *Guide*), the Public Health Service Policy on the Humane Care and Use of Laboratory Animals (PHS Policy) and all state as well as local regulations. Special attention is given to anesthesia and analgesia to reduce pain/distress when applicable. Pain relief will be provided based upon the approved protocol or if need be, veterinary intervention.

**Charles E. Schmidt College of Medicine Space and Facilities**

Located on the Boca Raton campus, the **Charles E. Schmidt College of Medicine (COM)** was officially approved to grant the Medical Degree by the Florida Universities Board of Trustees and the state of Florida in 2010. Currently COM is housed in two buildings (Biomedical Center- 71, Medical Education-104), which together house ~90 full-time faculty, ~256 medical students, and ~100 graduate students. As one of newest and rapidly rising medical schools from among 192 accredited medical schools in the U.S, COM has been nationally recognized for its innovative educational and research programs, including high marks for serving populations in need (#61), graduates practicing in rural areas (#85), and diversity of its trainees (#35) in the *2023 U.S. News and World Report*. Over the past five years, this rise in ranking is driven by several achievements, which include LCME re-accreditation for the full eight years, a stellar record of student success metrics, and a nearly 3-fold increase in external research funding. Collectively, these accomplishments attest to a growing record of excellence in medical and graduate education programs, which are continuously expanding to include dual degree programs (e.g., BS/MD, MD/MBA, MD/PhD) designed to meet regional and national workforce needs development. Notably, COM is seeking to transform the practice of medicine by engaging in cutting-edge research to address the genomic and socioeconomic factors driving chronic diseases, which receives nearly $30 million support from the National Institutes of Health (NIH), and by developing innovative educational programming in precision medicine, which includes a new “Genomics and Predictive Health” graduate certification, along with a proposed program in predictive population health.

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Under new leadership, Dean Pilitsis has re-dedicated our mission to be “Of the Community, For the Community”. As a community-based medical school, COM demonstrates a record of excellence in serving populations in need by offering opportunities for students and residents in Caridad Clinic, Mission Clinic, and Boca Resident Clinic. Specifically, Dr. Mary Labanowski works with medical students and patients to provide care to underserved populations at the Caridad Clinic. She uses this opportunity to teach students about clinical exam and reasoning skills when working in this challenging setting. Through service-learning projects at the Caridad Clinic and Mission Clinic, COM students gain early exposure to underrepresented patient populations, allowing them to experience firsthand issues with access to healthcare and social determinants of health. These initiatives demonstrate our commitment to serve the uninsured and underserved community in South Florida. Furthering this mission, our Emergency Medicine (EM) Department is working with local constituents (Dr. Angus Jameson, Director of EM services for the state; Dr. Terry Cohen, Medical Director of Boca Fire Rescue; and Chief John Treanor, Director of EMS in Boca Raton) to improve care in pre-hospital medicine with a focus on addiction medicine, psychiatry, and physical medicine. Our team has gained access to national databases to inform the work needed for pre-hospital medicine and has experience in these areas, including current funding in falls in the elderly causing head trauma. By partnering the Colleges of Nursing, Social Work, Arts and Letters (Public health administration), Science (Exercise Science), Undergraduate/Honors college (Pre-med research experiences), we determine how to best ensure safety with these novel treatment paradigms and iteratively refine algorithms while monitoring outcomes. Finally, we also collaborate across colleges with AI and data science experts to model not only the data but also best practices for care delivery and cost savings. Altogether, we seek to differentiate ourselves from other medical schools by providing an innovative, interprofessional education focused on delivery of personalized, data driven patient care at places where patients reside.

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**College of Medicine Cores, Equipment and Services**

The College of Medicine provides state-of-the-art shared facilities and resources to support the research activities of their faculty and trainees. Located on the Boca Raton campus, the following shared facilities are available:

Induced Pluripotent Stem Cell (iPSC) Facility: A full-time research assistant professor manages and provides service in this facility related to genome editing, culture, and differentiation of iPS cells for use in human disease modeling. The facility contains all necessary equipment, including a Sorvall Legend XIR centrifuge, Nikon Inverted Microscope, ThermoScientific CO2 incubators, Invitrogen neon transfection system, Biological Safety Level-2 Cabinets, and a Revco -135 ultralow freezer.

Molecular Facility:Two facilities offer two sets of the following equipment, a Life Technologies Thermocycler, Agilent AriaMX Real-Time PCR System, Vortexer, MX300SP Stratagene Q-PCR, Nanodrop ND 8000 Spectrophotometer, and Agilent 2100 Bioanalyzer.

Imaging Facility: The facility includes: a Licor Odyssey Infared Imager, Bio-Rad TransBlot Turbo, VWR e5430r refrigerated benchtop micro centrifuge, UVP EpiChemi II Darkroom, and Storm Phosphorimager.

Cell Analytics Facility:The facility includes BD FACS Calibur Analyzer, Orflo Moxi-Go, ACEA Biosciences xCELLigence RTCA DP system, and MEA2100 system (multi-microelectrode arrays).

Genomics Facility: The facility includes a VWR epMotion 5073 liquid handling robotic system, Diagenode Pico Disruptor and 10x Chromium ix. Also available are a nanopore sequencer, FreezerWorks laboratory management software and -135 freezer.

Proteomics Facility:The facility includes a FPLC, Lablanco freeze zone 4.5 plus, Bio Rad Protein Purification System, and BMG LabTech CLARIOstar.

Histology Facility**:** The facility includes 2 Leica cryostats, microtomes, and paraffin embedding station.

Additional Shared Equipment: Olympus Florescence Microscope, Biorad Biologic uv-vis detector/fraction collector, Biotek elx 800 microplate reader, Sorvall legend rt refrigerated centrifuge (2), Perkin elmer microbeta 2450 microplate counter, Thermos evolution 220 uv visible spectrophotometer, Sonics vibracell, Precision microprocessor controlled 280 water bath (2), ThermoSci Max Q6000 incubator/shakers (2), Isotemp 228 waterbath, ThermoSci Heratherm Oven, Zeiss invertoskop 40c microscope, Beckman coulter optima L80k ultracentrifuge, Panasonic autoclave, Eppendorf 5417R centrifuge, Beckman coulter Avanti J25 high speed centrifuge (2), Barnstead lab line MaxQ7000 waterbaths (2), Beckman OptimaMax tabletop ultracentrifuge, Biosafety cabinets for tissue culture (2), Heracell 150 incubators, Hypoxia Chamber CoyLab, GE Nanovue, spectrophotometer, 3D printer, Eppendorf vacufuge & Heto cold trap, Beckman coulter allegra centrifuge, Inotech Cell Harvester, New brunswick C76 water bath shaker, New Brunswick Series 25 floor model shaker, Thermo Stericycle incubators (2), Beckman coulter optima L90k ultracentrifuge, Leica RM 2155, Eppendorf Centra CL5 centrifuge, Eppendorf mastercycler thermal cycler, Ultrospec 500 pro spectrophotometer, Orbit shaker, BMG Labtech Polarstar omega, Leica microscope, BioRad gene pulser x cell, Spectramax m5, Thermofisher Hybrid shake n stack, Thermo Legend 21R Microfuge, Sorvall ST16 centrifuge, Hybrid Maxi14 hybridization oven, Nikon Eclipse TxZR microscopes (2), Waters HPLC w/electrochemical detector.

**College of Medicine Animal Facility (BC-71)**. The COM animal facility is a modified barrier 3,647 sq. ft. vivarium that houses only mice in three housing rooms. One animal room is equipped with three individual cubicles allowing separation of animals by specific study projects, e.g. use of viral vectors or reversed light cycle. Mice are housed in individually ventilated cages or microisolator cages and water provided via water bottle. Cage change is accomplished using changing stations (i.e. laminar flow hoods). Individual cubicles are opened only one at a time if applicable.  Animals are fed dedicated rodent chow (5L0D PicoLab® Laboratory Rodent Diet and 5LJ5 PicoLab® High Energy Mouse Diet). Environmental parameters such as temperature, humidity, ventilation criteria and light are controlled and/or monitored via a computerized “Watchdog” system in each cubicle. Caging and supplies are sanitized through a rack washer and/or sterilized via an autoclave within the facility. The vivarium contains a surgical suite, a multipurpose room with a downdraft table, and several other procedure rooms. One procedure room is dedicated to BSL2 work containing a Biosafety Cabinet Type 2B. Therefore, animal biohazard level 2 (ABSL2) studies can be supported in this facility. Animals cannot be returned from individual research labs once they have left the vivarium. Restricted access and PPE such as disposable gowns and gloves are required for entry to the animal facility. The vivarium is serviced by dedicated animal care staff.

This facility also houses an array of COM shared equipment, including Med Associates animal locomotor tracking system, Noldus behavioral mouse maze, Vevo Imaging System 3100, Neurostar motorized stereotaxic system, and microdialysis set up.

**Research Support Facility A (RSFA – 35A)**. The RSFA animal facility is a conventional 3,500 sq. ft. vivarium that houses aquatic species and rats. Larval salamander and freshwater turtles are housed in tanks with recirculating water systems. Feed is provided, water quality monitored and cleaning performed per species-specific SOP. Rats are housed in individually ventilated cages and water is offered via water bottle. Cage change is accomplished using changing stations (i.e. laminar flow hoods). Animals are fed dedicated rodent chow (5L0D PicoLab ® Laboratory Rodent Diet). Environmental parameters such as temperature, humidity, ventilation criteria and light are controlled and/or monitored via a computerized “Watchdog” system in each housing room. Caging and supplies are sanitized through a rack washer and/or sterilized via an autoclave in the facility as applicable. A surgical suite, several procedure rooms, and a necropsy room with a downdraft table are available within the vivarium. BSL2 studies (viral vectors) can be supported in this facility.  Animals can be returned from individual research labs as approved by the AV. Restricted access and PPE such as disposable gowns and gloves are required for entry to rodent housing area.

The **FAU Cell Imaging Core within the College of Medicine/Brain Institute** provides imaging services and light microscopy equipment to support scientific and clinical investigators at FAU and other institutions. Across the Boca and Jupiter campuses, the core houses five imaging systems, covering a variety of light microscopy techniques. Additionally, the core provides five powerful image data analysis workstations with advanced imaging software. Services of the FAU Cell Imaging Core include training on the equipment and experimental support. FAU’s Brain Institute entered a partnership with Nikon and became one of Nikon’s Centers of Excellence in 2016. Through this partnership, FAU and the Core have access to the latest optical systems (Nikon N-SIM E and A1+R combined Super Resolution and Confocal Imaging System) and benefit from excellent support by Nikon specialists.

**Other Cores, Equipment and Services**

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**I-HEALTH/Center for Molecular Biology and Biotechnology (CMBB).**

**Basic organic and peptide synthesis instrumentation**

Fume hoods, Liberty Blue Microwave Peptide Synthesizer, analytical Agilent 1200 HPLC w/diode-array and fluorescence and UV/vis detectors & automated sampler, preparative Agilent 1200 HPLC w/diode-array detectors & fraction collectors, analytical Agilent HPLC, Jasco J-810 spectropolarimeter with PTC-348WI temperature control unit, Buchi rotary evaporator, Labconco Freezone 12plus freeze dry system, Virtis lyophilizer, Labconoco freeze dryer, and Bruker Microflex LT mass spectrometer.

**Basic molecular biology instrumentation**

BioRad Mycycler, PCR thermal cyclers, MJ Research Opticon2 DNA Engine Real-Time Cycler, protein and DNA gel electrophoresis equipment (BioRad), Agilent Bioanalyzer 2100P, nanoDrop 2000, benchtop Illuminator UV/Vis (UVP), Berthold CentroPRO luminometer, Syngene G:box gel imager, Odyssey Gel and Western Blot Imaging System (Licor), Turbo Transfer, UV/visible spectrophotometers, microcentrifuges, sonicator, gel dryer, analytical balances, automated pipettors, water bath and dry bath incubators, homogenizers, sonicators and sonicating baths, vacuum pumps, pH meter, and magnetic stirrers.

**Cell culture and microbiology instrumentation**

Biotek Cytation 5 cell imaging multi-Mode reader, Nikon Confocal Olympus Fluorescence microscope, EVOS Floid Fluorescent Cell Imaging Station, ZOE fluorescent cell imager, Cellgene cell counter, Sartorius-Bioreactor, laminar flow hood, two CO2 incubators, Eppendorf 5810R centrifuge, Class II Type A Biosafety Cabinet for bacterial work, Thermofisher MaxQ 6000 incubator/shaker, Legend XTR centrifuge, bright field microscope, inverted phase contrast microscope, automated cell counter, Innova 4000 Benchtop Incubator Shaker, Thermo Scientific MaxQ 5000 Shaker/Incubator, and Branson sonicator. Both cell culture facilities on the MC17 second floor are BSL-2 facilities.

**Protein purification instrumentation**

Amersham/GE ÄKTAFPLC protein purification system, Bio-Rad NGC chromatography system (preparative FPLC), and chromatography refrigerated cabinet.

**Enzymology instrumentation**

Biotek Synergy H1 Microplate Reader, Molecular Devices ThermoMax 96-well UV/vis absorbance plate reader, and Molecular Devices SpectraMax Gemini 96/384-well fluorescence plate reader.

**Other:**

Northern Lipids LIPEX Extruder and electroporation apparatus.

**General and storage equipment**

-80 °C freezer, -30 °C freezer, refrigerators, “Locator 6+” cryogenic storage unit, a shaker/roller system, water baths, bench top refrigerated microcentrifuge 5424R (Ependorf), Labconoco SpeedVac, high-speed and high-capacity centrifuges (Beckman L8-80M, Beckman Optima Max–TL, Sorvall RC-5C), KNF LABOPORT vacuum pump, Accumet pH meter, analytical balance (Mettler), darkroom for film development, cold room, and specimen storage.

**I-SENSE**

The College of Engineering & Computer Science manages two fully loaded and functional machine shops which include a drill press, a Harig grinding table, 5 lathes (Bolton enclosed CNC, Hurco enclosed CNC, Clausing CJ550VSJ 15” manual, Clausing Professional 15 manual, and Collet manual tool), 5 mills (Top Well Bed 40 CNC, Hurco TM10i enclosed CNC, Clausing knee R8 power feed, and 2 Clausing knee 40 CNCs), a sander, 3 saws (band, Bolton cutoff, and Dake Johnson VH24 verticle band), a water jet, 3 welders (MIG, plasma, and TIG), and a Lincoln Torchmate 4800 plasma table. Representative instruments of I-SENSE include a large-volume laser cutter, PCB printer, a variety of 3-D printers, soldering stations, oscilloscopes, digital inspection microscopes, testing harnesses, spectrum analyzers, and a range of standard COTS hardware. The College of Engineering provides additional access to multiple prototyping facilities, test and measurement laboratories, and parts rooms.

**Department of Chemistry & Biochemistry shared equipment.**

Varian Mercury Plus 400 MHz NMR spectrometer, Varian Inova 500 MHz NMR spectrometer, Bruker 400 MHz NMR spectrometer, Malvern PEAQ isothermal calorimeter (ITC), Liberty Blue Microwave Peptide Synthesizer, Applied Biosystems Voyager DE-PRO MALDI-TOF mass spectrometer, Thermofisher LTQXL linear ion trap mass spectrometer, Jasco J-810 spectropolarimeter with temperature control unit, and Perkin Elmer Turbomass GC-MS.

**Other Partner Cores, Equipment and Services**

**Scripps Florida Core Equipment.** Through a reciprocity agreement, FAU faculty and trainees have access to the specialized core facilities at the Scripps Florida located on the FAU Jupiter campus. These include the following core facilities:

Flow Cytometry Core:  Instrumentation includes: BD FACSAria3, BD FACSAria Fusion, BD LSR2, Beckman Coulter Gallios, BD Canto, LCM microscope, Hemavet 950FS, BD 12x75mm tube with cell strainer cap, and LEICA LMD 7000.

Genomics Core: Tools include: Illumina NextSeq500, ABI SOLID5500 and EZ Bead system, Ion Torrent Personal Genome Machine, Ion Torrent Proton, Affymetrix GeneChip System, Quantitative RT-PCR:  a Roche Light Cycler 480 instrument and an Applied Biosystems A Step One Plus instrument, Agilent 2100 Bioanalyzer and Tapestation 2200, and a Hamilton Microlab STARlet Robotic Liquid Handler Unit.

High-Throughput Screening: This center includes a dedicated Agilent 1200 series LCMS with multimode mass spectrometry (ES, APCI, ELSD) dedicated for quality control of incoming HTS compound libraries and hit confirmation efforts. Microbiology:  This lab is equipped with Class II hoods, refrigerators and freezer storage, bulk reagent dispensing, microplate reading and is even capable of HTS screening BSL-2 organisms in 1536-well microplates. For molecular research PCR machines and post-PCR equipment is available allowing for cloning and expression work to be done. For large scale protein purification there is an Akta FPLC installed inside a double glass door refrigerator. Time kill and bacteria kinetic assays are facilitated by Spiral Biotech spiral platers and Qcount imaging colony counters. We have cutting edge imaging apparatus to allow visual inspection of membrane active compounds and have implemented one of the most advanced and sensitive methods for the early detection of anti-proliferative effects by inhibitors.

High Performance Computing:  The primary HPC cluster, named “Sepa,” currently consists of more than 456 processors and 456 GB of distributed memory. The system uses a distributed batch queuing system called “Sun Grid Engine.” This software provides researchers with simple ways to submit complex jobs to the compute cluster.  In addition to the HPC cluster, there are also several small-scale SMP machines for memory-intensive tasks. Also, two large dedicated SMP machines are available. These machines each have 128 GB of RAM and 32 cores, making them ideal for large computational tasks that cannot be run on the HPC cluster.  Connections of up to 10 Gb/s to peer research institutions are possible over the National LambdaRail and Internet2 research networks.  Scripps Florida also maintains a large-scale tape backup and disk archival system. The system is capable of scaling to provide up to 2.4 petabytes of uncompressed capacity.

Histology:  The Scripps Florida Histology Core (SFHC) is equipped with the appropriate ventilated working areas and equipment to prepare, process and stain frozen or paraffin embedded specimens.  The Histology Core contains the following instrumentation: VIP Tissue Processor, BIOCARE NxGen Decloaking Chamber, Rotary Microtome, Staining Center, Leica Cryostat, and Zeiss Axio Microscope/Camera Software.

Metabolic Core:  The metabolic core includes: CLAMS units, Minispec LF-50/mq 7.5 NMR (Brucker Optics) analyzer, BioDAQ system (Research Diets), Metabolic Cages (Tecniplast), DSI Telemetry Systems (Data Sciences International), MC4000 blood pressure and heart rate analyzer for mice (Tailcuff method, Hatteras Instruments), Mouse Ox Plus Vital signs monitor (Starr Life Sciences).  Laboratory Tests and Instrumentation:  The Cobas c311 clinical chemistry analyzer (Roche Diagnostics), a GM7 analyzer (Analox instruments), a Luminex 200 (Luminex Coorporation), 24 and 96-wells Sea Horse analyzers (SeaHorse Biosciences), and an AR-2000 radio-TLC Imaging Scanner (Eckert & Ziegler).

Nuclear Magnetic Resonance (NMR): Instrumentation includes three Bruker nuclear magnetic resonance instruments, two Avance 400 MHz ULTRAShield instruments and one Avance III 700 MHz ULTRAShield instrument. The machines run 24 hours a day, 365 days of the year and are fully equipped to run multi-nuclear 1D and 2D experiments, with both direct and indirect detection for a variety of nuclei.

Proteomics and Mass Spectrometry:  The core  includes:  ThermoQ Exactive with Thermo Easy-nLC 1000 Liquid Chromatograph, Thermo LTQ Orbitrap with Eksigent NanoLC Ultra, Thermo LTQ-ETD with Agilent HP1100, Bruker MALDI-ToF (MicroFlex), Agilent 1100 with UV and fraction collector HPLC, TA Nano Isothermal Titration Calorimeter (ITC).

X-Ray Crystallography Core Facility:  The core includes:  Minstrel III, RoboIncubators, Leica stereomicroscope, Gryphon Crystallization Robot, Bruker AXS Smart APEX CCD﻿diffraction system, Rigaku MicroMax-007 HFM X-ray generator with a VariMax HR optics and an X-Stream 2000 crystal cryo-freezing system, Mar345dtb image plate detector, and Proteros Free Mounting System (FMS)**.**

**Max Plank Core Equipment.** Through a reciprocity agreement, FAU faculty and trainees have access to the specialized core facilities at the Max Planck Florida Institute of Neuroscience located on the FAU Jupiter campus. These include the following core facilities:

Electron Microscopy Core. Instrumentation includes a FEI Tecnai transmission electron microscope, Zeiss Merlin VP Compact scanning electron microscope, High-pressure freezing system (HPM100), Automatic freeze-substitution device (AFS), Cryo-preparation system (CPC), Ultramicrotome (UC7), and a Freeze-fracture system (JFDV). The facility is also capable of Serial Block Face Scanning and Serial Automated TEM EM.

Microscopy Core:  The Optical Workshop and Light Microscopy Core provides state-of-the-art technology includes a Zeiss LSM 780 confocal system, Leica SP5 II resonant confocal system, and a Prairie Moving In Vivo Multiphoton system.

Mechanical Workshop:  The Mechanical Workshop designs and builds commercially unavailable equipment and customizes existing tools for use in novel research methods by MPFI scientists.  The Mechanical Workshop features a 5-axis high-speed CNC milling machine and a 3+2-axis CNC milling machine.

**FAU Bioaccelerator: From Bench to Bedside**

FAU’s annual economic impact is estimated at $6.3 billion. This is due, in part, to FAU’s strong ties to the local private sector and proactive stance toward the stimulation of new technology and business ventures. The Research Park at Florida Atlantic University®, a 70-acre campus housed on the Boca Raton campus, is home to technology companies and research-based organizations working to support the research and development activities of FAU foster economic development and broaden the economic base of Broward and Palm Beach counties. The only state university affiliated research park in South Florida, it is home to dozens of high-tech companies and five support organizations. It also operates the premier Technology Business Incubator (TBI) in the region and hosts space for FAU Tech Runway**.**

FAU Tech Runway**,** established in 2014, is an entrepreneurship program that fosters startup companies aligned with FAU’s research expertise and focus areas. A South Florida public-private partnership, FAU Tech Runway serves as a core entrepreneurship hub to accelerate technology development and incubate startup companies. This incubation and acceleration takes place in a 28,000-square-foot collaborative working space that provides entrepreneurs with a complete ecosystem to house, educate, mentor and fund their ventures from ideation phase through to the scaling stage. To date, FAU Tech Runway has launched and served 72 startup companies, which have collectively raised more than $63.5 million in capital, created more than 350 jobs and generated more than $64.7 million in sales revenue.

Students are a key part of the entrepreneurship cycle. The “FAU Wave” program incentivizes undergraduate students to create innovative individual or group projects that solve real-world problems or fill niches in the business or non-profit sectors. The two-semester program helps students find faculty or graduate mentors, obtain resources and equipment to develop their prototype or idea, and showcase their work for a year-end awards competition. Related programs, such as I-CORPs, funded by the National Science Foundation, help participants further implement and grow their idea by receiving valuable market feedback from potential customers.

**FAU Undergraduate and Graduate Education**

FAU’s student body ranks as the most ethnically and culturally diverse in Florida's State University System! For the second year in a row, U.S. News and World Report has included FAU on its list of the most ethnically diverse universities in the United States. Currently, nearly 30,000 students are enrolled at the university, and more than 45% identify themselves as minority students. FAU is also designated as a U.S. Department of Education Hispanic-serving Institution with an enrollment of 27% Hispanic undergraduates. In addition to ***enrolling*** diverse students, the university also ***graduates*** a high number of underrepresented minority students. According to the 2019 *Diverse: Issues in Higher Education*’s Top 100, FAU ranked 36th among other U.S. institutions in total minority bachelor’s degrees awarded, 9th in conferring bachelor’s degrees to African-American students, and 36th in conferring bachelor’s degrees to Hispanic students. Notably, FAU placed 12th in conferring biological and biomedical science degrees to African-American students and 26th in conferring biological and biomedical science degrees to Hispanic students. Additionally, FAU placed 12th in awarding of health profession degrees to African-Americans.

I-BRAIN offers a PhD program in FAU Graduate Neuroscience Education Program. This graduate program unites scientists, educators, and students from three FAU Ph.D. programs (Integrative Biology-Neuroscience, Complex Systems and Brain Sciences, and Experimental Psychology) and from two internationally recognized research institutes (the Max Planck Florida Institute for Neuroscience and the Scripps Research Institute’s Florida campus) into a one-of-a-kind training opportunity. I-BRAIN faculty, investigators, and students also regularly organize seminars, poster sessions, training activities, symposia, and networking events to help foster collaborative exchange of scientific ideas and to increase exposure and opportunities for scientists and students. I-BRAIN plays an active role in educating the community about the promise and progress of brain research. The Institute’s ASCEND (Advancing STEM: Community Engagement through Neuroscience Discoveries) program, targeted toward middle- and high-school students, taps the energy and intellect of undergraduate, graduate, and postdoctoral neuroscience trainees to excite and inspire future neuroscientists.