

Facilities and Other Resources

University of Pennsylvania (UPenn)

Penn's 12 schools include some of the top-rated undergraduate and graduate programs in the world. Because they share one contiguous campus, collaboration, and the integration of knowledge across the disciplines happens in formal and informal settings every day. This unique aspect of a Penn education prepares students to excel in an increasingly complex 21st century world. The University of Pennsylvania is one of the nation's premier biomedical research institutions, home to the first medical school and first school hospital in the country.

Perelman School of Medicine (PSOM)

As America's first medical school, the PSOM has a long-standing commitment to education, research, and patient care. Today, it consistently ranks among the top medical schools in the country and among the top three in grants awarded by National Institutes of Health. The Perelman School offers outstanding Ph.D., Master's, and combined-degree programs, in addition to medical degrees. Students receive training in the nationally acclaimed hospitals of the University of Pennsylvania Health System (UPHS), a network of medical facilities known for a dedication to high-quality patient care. Since the foundation of the Institute of Translational Medicine and Therapeutics (ITMAT) in late 2004, there has been an institutional focus of resources on research at the interface of basic and clinical science with the objective of accelerating the translation of basic discoveries into novel therapeutics.

The PSOM endeavors to provide a superior intellectual environment, state-of-the-art technology, and a full complement of scientific resources to promote innovative and discovery-based research in all areas of biomedical research. This is reflected in our 22 research cores, offering a wide variety of services through 71 facilities, ranging from genomic analysis to cell sorting to gene editing and chimeric mouse cores to single cell biology (administered by ITMAT) to high-resolution electron microscopy. Linking these is the ITMAT supported eagle-i resource. Through these diverse resources, access is provided to the highest level of equipment and instrumentation, technical expertise, training, and education all designed to support innovative, cutting-edge research throughout Penn. In FY19, PSOM contributed more than \$6.84M in institutional financial support for our core facilities. In addition, PSOM has made significant investments in recent years to establish or enhance the shared resources provided to the research community. Chief among these are: the ~\$20M invested in the PET imaging resources over the past ten years, more than \$10M in FY18 to install a cutting-edge cryo-electron microscopy center, and more than \$10M invested over the past five years to enhance our informatics, genomics, and computational resources.

Penn Medicine

Penn Medicine consists of the PSOM and the UPHS, which together form a \$8.6 billion enterprise. The PSOM received just under \$500 million from NIH in the 2019 fiscal year. Penn Medicine is an integrated enterprise under the leadership of Larry Jameson MD PhD, the Dean of PSOM and the EVP of the Health System to whom Kevin Mahoney, CEO of the UPHS reports. This structure has greatly benefited the academic enterprise and, in particular, Clinical and Translational Science.

UPHS patient care facilities include: the Hospital of the University of Pennsylvania and Penn Presbyterian Medical Center—which are recognized as one of the nation's top “Honor Roll” hospitals by U.S. News & World Report—Chester County Hospital; Lancaster General Health; Penn Medicine Princeton Health; and Pennsylvania Hospital, the nation's first hospital, founded in 1751. Additional facilities and enterprises include Good Shepherd Penn Partners, Penn Medicine at Home, Lancaster Behavioral Health Hospital, and Princeton House Behavioral Health, among others. These hospitals have 3,095 licensed beds and had combined outpatient visits of 5.9 million and inpatient admissions of 135,188 in fiscal year 2019.

Penn Medicine is powered by a talented and dedicated workforce of more than 43,900 people. The organization also has alliances with top community health systems across both Southeastern Pennsylvania and Southern New Jersey, creating more options for patients no matter where they live.

Penn Medicine is committed to improving lives and health through a variety of community-based programs and activities. In fiscal year 2019, Penn Medicine provided more than \$583 million to benefit our community. Presently

Penn Medicine is working closely with the city and its partner institutions in providing care and testing for patients exposed to COVID-19.

Penn Medicine has advanced medicine through excellence in education, research and patient care. The Perelman Center for Advanced Medicine (PCAM) exemplifies the advanced technology and integrated care offered by Penn Medicine. This outpatient facility opened in 2008 and now houses the Penn Lung Center, the Abramson Cancer Center, the Roberts Proton Therapy Center, the Penn Heart and Vascular Center, an outpatient surgical pavilion, and a host of other subspecialties. Importantly, this building is physically integrated with our medical school and with the Smilow Center for Translational Research that houses ITMAT. Thus, this complex presents an architectural metaphor for the integration of research, education and patient care.

Penn Medicine has invested heavily in neuroscience, neurology, and geriatric medicine. We list below the many departments, centers, and institutes which provide important expertise and resources available to this collaboratory.

School of Nursing

The School of Nursing is one of the nation's premier research institutions in nursing science. Penn Nursing faculty consistently receive more research funding from the National Institutes of Health than any other private nursing school, and many master's programs are ranked first in the country. Students are offered unparalleled resources and experiences, including a state-of-the-art simulation lab, a nurse-led elder-care practice, and classrooms equipped with the latest technologies.

Office of Nursing Research (ONR). The ONR is designed to support faculty and students in applying for, obtaining, and managing funding for scientific research projects. The ONR delivers a suite of services throughout the lifespan of a research grant - from conception to closeout. The ONR also provides highly-skilled statistical support, hosts an expertly staffed state-of-the-art nursing research laboratory, conducts mock reviews, offers guidance with IRB protocol submission and regulatory compliance, and provides editing services for scientific and English content of proposals. The ONR also provides various learning opportunities for faculty, staff, and students through weekly colloquia and six face-to-face Responsible Conduct of Research seminars a year. Colloquia are presented by Penn Nursing faculty and guest lecturers from complementary disciplines to foster multidisciplinary research collaborations and initiatives.

*BECCA (Biostatistics * Evaluation * Collaboration * Consultation * Analysis) Lab.* Statistical support is provided by Alexandra Hanlon, PhD, Jesse Chittams, MS, and several additional Masters' prepared statisticians. The BECCA (Biostatistics * Evaluation * Collaboration * Consultation * Analysis) Lab facilitates research through pre-award support (power analysis, statistical methods, and IRB-related issues), post-award support (data management, data analysis, consulting, and abstract/ manuscript preparation), and training (independent study opportunities for students, research residencies, T.A. mentorship, and dissertation advising).

Research Server: Secure, firewalled server dedicated to research; available to faculty, students, and staff for research data. Request dedicated folder from ITS.

- REDCap: Penn nursing supported clinical data management system for faculty, students, and staff.
- Qualtrics: Penn-approved survey instrument; cloud-based; licensed for all faculty, students and staff.
- Penn Box: Penn-approved secure collaboration site for confidential data (HIPAA BAA pending).
- Virtual Portal: Penn nursing access to software licensed on the virtual server, for faculty, students, and staff.

SON statistical packages include:

- SPSS – Virtual concurrent licensing (100) for all faculty, students, and staff.
- SAS – Accessed via Virtual, server-based licensing for all faculty, students, and staff.
- STATA – Regular licenses available via Virtual, 10 concurrent uses for now.
- Atlas – Qualitative software license. Virtual, 10 concurrent uses, for all faculty, students, and staff.
- R – Free statistical software (virtualized to run on Research Server).
- PASS – Licensed for PhD students. Virtual concurrent use licensing for 10.
- NVivo – Qualitative software licensed individually.
- MPlus – Statistical software virtualized for four individual users.

Laboratory of Innovative and Translational Nursing Research (LITNR). LITNR is a translational research facility which conducts bench, applied, and clinical studies. It is both physically and operationally available for faculty and students in the School of Nursing to conduct research. The LITNR is a 2500 square foot shared laboratory space. The laboratory has full cell culture and gene and protein expression measurement capabilities. It also has isolated cardiovascular tissue measurement capability for Langendorff hearts and histology/microscopy capabilities. It has 9 benches, two -80°C freezers, and standard laboratory equipment such as: a cryostat, an Applied Biosystems real-time PCR machine for DNA analysis and gene expression quantification; a microplate reader for running ELISA/immunoassays, a ProteinSimple protein and DNA analyzer, and a YSI 2300 glucose/lactate analyzer. It also has a Biopac human physiology system with noninvasive measurement capabilities for cardiorespiratory variables.

Center for Health Outcomes and Policy Research (CHOPR) - is an NINR/NIH funded research center for nursing outcomes research and also offers pre- and postdoctoral training in nursing outcomes research through an institutional NRSA (T32NR07104) funded by NINR/NIH. CHOPR conducts research on health care and workforce organization, financing, and outcomes, and on public policies that influence nursing and health care delivery in the U.S. and internationally. Researchers monitor trends and evaluate programs and policies that potentially affect patients' access to and quality of care. Its faculty and students are drawn from nursing, sociology, demography, medicine, health management and policy, and health economics. CHOPR's research and training programs are interdisciplinary, and well integrated with health services and policy and social science resources throughout the University.

NewCourtland Center for Transitions and Health - The Center assumes responsibility for creating an environment to foster, support, and sustain high quality health transitions research. The aims of the Center are to advance the science regarding the critical relation between nursing and optimal transitions in health by generating knowledge related to transitions for the chronically ill and their caregivers; build nursing research and leadership capacity to assure a sustained investment in this line of inquiry, and promote the use of research findings by clinical leaders and policy makers to optimize outcomes of health transitions among chronically ill populations. The Center achieves these goals by fostering multidisciplinary research and contributing to the development of nurse scholars in this area of intellectual inquiry. The Center also offers pre- and postdoctoral training in nursing outcomes research through an institutional NRSA (T32NR009356) funded by NINR/NIH. The work of the Center is guided by an adaptation of Edward Wagner's Chronic Care Model and focuses on optimizing health care and outcomes associated with transitions in health. The research agenda focuses on the growing population of chronically ill adults with a special focus on frail elders. Using multiple research methods, the research being conducted by the members is creating a body of knowledge that will directly benefit this vulnerable population.

Penn Nursing Home Care Suite. The Home Care Suite is an actual home environment within the *Helene Fuld Pavilion for Innovative Learning and Simulation* serving as a platform to facilitate new ideas and tools for processes and systems that promote health and wellness, disease prevention and management *in the home/community setting* across the lifespan. Within this space various technologies are installed (for short or long term) and pilot-tested. The goal is to accelerate design and testing of innovative health solutions in the home recognizing that simulated environments yield more unique responses and drive better explorations about prototypes and solutions. Furthermore, this space is promoting interdisciplinary collaboration facilitating ongoing dialogue and synergies between nursing and other disciplines including engineering, computer science, design and architecture. This space serves as an incubator for homehealth innovation-a platform to facilitate generation, validation and testing of ideas about the future home. The Portable Usability Lab (Noldus Information Technology, Lesburg, VA) includes an electronic tablet, Morae recorder software (version 3.3), and a video-camera. It allows for direct observation (and audio-and video recording) of user interactions with technology applications. The Noldus Portable Usability Lab allows the conduct of field research studies. It supports synchronous recordings of human-computer interactions, video and audio, high resolution screen capturing, and is operating system independent. The entire suite has built-in microphones and video-cameras allowing for recordings of observations and simulations of various scenarios involving patients living in a home or nursing home setting. This infrastructure is controlled remotely by the adjacent Control Room of the Helene Fuld Pavilion Simulation Center.

School of Arts and Sciences (SAS)

SAS houses 26 departments and nearly 500 faculty scholars with honors that include the National Medal of Science, the MacArthur Fellowship, Pulitzer and Nobel Prizes. SAS enrolls nearly half the University's students and is integral in the education of all undergraduates as well as many graduate and professional students, lifelong learners, and working professionals. Undergraduate offerings include 54 majors, signature interdisciplinary programs, and distinguished dual-degree programs such as the Huntsman Program in International Studies and Business and the Vagelos Program in Life Sciences and Management. Graduate offerings include 33 doctoral and 10 master's programs.

School of Dental Medicine

Established in 1878, Penn Dental Medicine is one of the oldest university-affiliated dental schools in the country, and has set numerous precedents in education, research, and patient care. Academic programs include a DMD program with dual-degree options in education, bioethics, bioengineering, and public health; postdoctoral training in eight specialties with an option for a master's in oral biology; and a degree program for foreign-trained dentists. Penn Dental Medicine encompasses basic and clinical sciences and provides community dental care in teaching clinics and faculty practices. Its students serve more than 20,000 local residents, logging close to 9,600 service hours each year.

School of Engineering and Applied Sciences (SEAS)

Founded in 1852 as the School of Mines, Arts, and Manufactures, today's School of Engineering and Applied Science is a vibrant part of the University. At Penn Engineering, world-acclaimed faculty, state-of-the-art research laboratories and highly interdisciplinary curricula offer students an unparalleled experience. Innovation and technology drive the program and transform the fundamentals of what future engineers are learning. Penn Engineering students play a critical role in asking and answering the questions that will improve human health and transform the world.

Penn Law

Penn Law offers a legal education enhanced through cross-disciplinary study opportunities. To complement their rigorous legal training, students can take classes to earn certificates or joint degrees at other Penn schools and programs, such as Wharton or the Center for Bioethics. The School's intellectual vitality is defined by the faculty, an outstanding group of scholars whose collective expertise covers every major legal area. More than 70 percent of Penn Law professors hold advanced law-related degrees beyond the JD, and more than 50 percent have joint appointments or affiliations with other Penn schools. Dr. Sargent (Director, Ethics and Policy Core) is an Assistant Professor at Penn Law.

School of Veterinary Medicine

Penn Vet focuses on providing the best care to pets, preventing zoonotic diseases in animals and humans, protecting the food supply, and discovering treatments for animal illnesses. Since 1884, Penn Vet has recognized that human and veterinary medicine are "one medicine," and close ties with the Perelman School of Medicine have resulted in groundbreaking research. The Philadelphia campus includes the Matthew J. Ryan Veterinary Hospital for small and companion animals, and Kennett Square's New Bolton Center houses the George D. Widener Hospital for Large Animals. Penn Vet also plays an integral role in supporting Pennsylvania agriculture.

The Wharton School

Founded in 1881 as the world's first collegiate business school, Wharton is globally recognized for intellectual leadership across every major discipline of business education. Wharton delivers the knowledge to take action and advance society through leading programs at every level: undergraduate, MBA, executive MBA and doctoral. The School also reaches out annually to 9,000 participants through Executive Education programs. Published in multiple languages, the school's online journal, *Knowledge@Wharton*, reaches more than 1.7 million global subscribers. Wharton's 88,000-plus graduates make up one of the largest business school alumni networks in the world.

The Children's Hospital of Philadelphia (CHOP)

CHOP has a long-standing and continuing commitment to developing the leaders in medicine and science, expanding the frontiers of pediatric care through novel research programs and translational research, and applying those advances to clinical care. CHOP is autonomous medically, administratively and financially. In FY2019, CHOP received more than \$260M in extramural sponsored program funding, with 57% being federally

funded projects. CHOP's main campus is directly adjacent to the PSOM and the Hospital of the University of Pennsylvania.

Seven academic departments at Children's Hospital of Philadelphia engage in interdisciplinary research to inform best practices that improve children's health and well-being. Pediatrics operates as a fully integrated department of both CHOP and the University of Pennsylvania. Pediatrics is the largest Department in the Hospital and is organized into Divisions representing the major subspecialties. The Department stands among the premier academic pediatric departments in the country, with its growing clinical network and increasing number of faculty conducting basic and clinical research. Six departments share staff and resources with their corresponding departments within the PSOM.

CHOP is the major provider of primary health care services for children of West and South Philadelphia, and a major tertiary referral center for the greater Delaware Valley area. The CHOP main campus includes inpatient, outpatient, research, and rehabilitation facilities in an interconnected complex of buildings. Annually, CHOP receives approximately 29,000 inpatient admissions, nearly 90,000 emergency room visits, and nearly 1.4 million outpatient visits. CHOP's Delaware Valley Network, with 46 locations, includes 31 primary care facilities, 14 Specialty Care Centers, and partnerships with 11 community hospitals. Patient care activities have continued to grow. CHOP's main campus features the 564 bed Main Hospital, the Buerger Center for Advanced Pediatric Care, the Richard D. Wood Ambulatory Care Center, and the Children's Seashore House rehabilitation facility.

Department of Neurology

Founded in 1871, the Department of Neurology at the University of Pennsylvania is the oldest neurology department in the country, and has a long history of excellence in patient care, research, and education in both adult and pediatric neurology. Today, Penn Neurology faculty members are engaged in groundbreaking research and clinical trials involving many complex neurological disorders. The Department includes over 130 full-time and associated faculty with a full range of clinical activities. The department is organized into 17 clinical divisions and provides patient care in state-of-the-art facilities located in the Hospital of the University of Pennsylvania (HUP), Penn Medicine at Radnor, Pennsylvania Hospital, Penn Presbyterian Medical Center, the Children's Hospital of Philadelphia and the Philadelphia Veteran's Administration Hospital. Neurologists at Penn conduct more than 40,000 outpatient visits annually. Penn Neurology is perennially ranked highest in the region by U.S. News and World Report. Penn has also been in the top ten neurology departments with respect to NIH funding for over ten years, and features nationally and internationally recognized research programs in Alzheimer's disease, frontotemporal dementia, Parkinson's disease, amyotrophic lateral sclerosis (ALS), cognitive and behavioral neurology, neuromuscular disease, neuro-ophthalmology, neuro-virology (including HIV), epilepsy, stroke and functional neuroimaging. Dr. Karlawish (PI) has a secondary appointment in this department.

Department of Medicine

As the nation's first Department of Medicine, the Department of Medicine at the University of Pennsylvania maintains high standards with dedicated research laboratories and facilities while being a leader in advancing patient care through research and clinical trials. The department is home to over 625 distinguished faculty and over 150 residents. The Department's divisions are home to nationally recognized ACGME accredited fellowship training programs and over 140 fellows-in-training. The department is home to 12 nationally recognized primary care and specialty divisions and several multi-disciplinary centers and institutes. The department is internationally recognized for breakthrough discoveries impacting medical care. Department faculty receive over \$170,000,000 in extramural support and publish over 150 high-impact (i.e. top 22 biomedical journals) manuscripts annually. Faculty practice within state-of-the-art clinical facilities including four core Philadelphia hospitals (Hospital of the University of Pennsylvania, Penn Presbyterian Medical Center, Pennsylvania Hospital, and the Philadelphia VA Medical Center) and newly constructed outpatient multi-specialty centers-of-excellence including the Perelman Center for Advanced Medicine (PCAM). Departmental faculty host over 550,000 outpatient visits annually.

Division of Geriatric Medicine

The Division of Geriatric Medicine, housed within the Department of Medicine, specializes in comprehensive care for seniors with complex illnesses and multiple physical and mental illnesses, and offers preventive care for seniors, and support of family members inclusive of care coordination. The division cares for seniors in the home, hospital, nursing home or office with the goal of advocating for the highest quality of life during all stages of

illness. Board-certified physicians, nurse practitioners, nurses, social workers and support staff who provide a full range of primary and specialty medical care for older adults as well as investigators who explore a range of aging issues are all included in the Division. Faculty members are regional and national leaders in aging research, education and clinical care. Penn geriatric medicine providers are specialty trained in aging wellness with attention to the early diagnosis and effective treatment of conditions related to aging. The team of clinicians includes experts in dementia, perioperative care and chronic diseases and investigators research health disparities, Alzheimer's disease, sleep disorders and the interface between socioeconomic status and disability. Dr. Karlawish (PI) is a faculty member in the Division and leads the Division's efforts to build research faculty and promote linkages between the Penn Memory Center and the Division of Geriatric Medicine.

Department of Psychiatry

Penn Psychiatry excels in research, education and, providing the most cutting-edge psychiatric care to patients. The department offers advanced training programs including multiple research fellowships and tracks (T32s and R25s), clinical fellowships in all ACGME approved subspecialties, Public Psychiatry fellowships, Psychology Internships and more. The psychiatry research portfolio at Penn, the VA and Children's Hospital of Philadelphia is expansive and Penn Psychiatry routinely ranks in the top 5 for NIH funding. Research topics include molecular mechanisms of neuropsychiatric conditions, neurocircuitry, implementation science, neuromodulation, and health policy research. Across the University of Pennsylvania Health System, Penn Psychiatry offers inpatient services, partial hospitalization programs, outpatient specialty services, employee assistance programs, and integrated services.

Penn Center for Health, Devices and Technology (Penn HealthTech)

Penn Health-Tech, Directed by Dr. Brian Litt (IAC) is an interdisciplinary center launched in 2017 to advance medical device innovation across the Perelman School of Medicine and the School of Engineering and Applied Sciences. They do that in two primary ways: helping to forge collaborative connections among Penn researchers and providing seed funding to incubate novel ideas to advance health care.

Through the Penn Health-Tech Pilot Award Program, they provide seed funding, project management support, and connections to subject matter experts to innovators across the University of Pennsylvania ecosystem. Penn Health-Tech maintains a portfolio of medical device and health technology development projects, moving them from the novel research and discovery phases through prototyping to proof of concept.

Funded pilot projects have included:

- An Augmented Reality Surgical Navigation System
- Biomaterial Delivery System to Localize and Direct Stem Cells for Enhanced Cartilage Repair
- Human Blinking Eye-On-A-Chip for In Vitro Testing of Contact Lenses
- Hypknowledge
- Improving Sensitivity of Liquid Biopsy
- Microscopic Robot-Assisted Axon Regrowth for Rapid Repair of Peripheral Nerve Injuries
- Non-Invasive Detection of Elevated Intracranial Pressure with Near-Infrared Light
- Novel Surgical Platform for Predictive Analytics and Intelligent Guidance
- Remotely Adjustable Pulmonary Artery Band

Institute for Biomedical Informatics (IBI)

IBI provides leadership, education, and critical infrastructure to advance the integration and application of informatics methods and software in biomedical research including studies of common neuropsychiatric diseases such as depression, anxiety, stroke, and dementia. The institute includes more than 70 informatics faculty from across the University of Pennsylvania and offers certificate and Master's degrees in biomedical informatics. The IBI has developed or supported several of the AI efforts mentioned in the proposal including PennAI for automated machine learning, PennTURBO for clinical data integration, and PennSignals for clinical decision support.

Penn Translational Neuroscience Center

The PTNC at the Perelman School of Medicine (PSOM) and Health System integrates Penn's interdisciplinary, world-class neuroscience programs in patient care, education, and research by supporting pilot projects, clinical

neuroscience initiatives, educational events, and start-up funding for junior faculty appointees in the clinical neurosciences.

Mahoney Institute for Neurosciences

The first university based neuroscience institute founded in the US, has provided the infrastructure for interdisciplinary research in neuroscience at Penn for over 50 years. With 150 faculty from 32 departments in six schools at Penn, MINS is directed by John Dani, the chair of the Department of Neuroscience, and fuels cross-disciplinary thinking and an integrated approach to fundamental, pre-clinical, and clinical research on the brain. MINS and the PTNC focus on integrating basic and clinical neuroscientists across the University and are closely aligned to better integrate neuroscience research at Penn. For example, PTNC-MINS support two three-year Translational Neuroscience Initiatives (TNIs) of \$400,000 each. These Initiatives emphasize science that builds sustained, multi-disciplinary collaborative teams, a perfect matrix for ADRC trainees. Notably, the target areas of TNIs has included immune aspects of neurological and neuropsychiatric disease and immune therapy for neurodegenerative diseases was one of the referenced examples of a multidisciplinary theme.

Center for Functional Neuroimaging

This center draws on multidisciplinary expertise to advance the general interests of the brain imaging community by managing imaging resources, regulatory support, and organizing symposia and colloquia related to neuroimaging in humans and in vivo models.

MindCORE (Mind Center for Outreach, Research, and Education)

MindCORE, led by Joe Kable, is designed to unite researchers, programs, and initiatives involving human intelligence and behavior across the University. A main focus of the center is to catalyze new research on the mind and foster innovative collaborations across Penn. MindCORE strategically supports these efforts with resources such as seed funds, technology, staffing, and programming. MindCORE participates in a variety of outreach programs, including partnerships with local museums and community organizations, to engage the academic community and the public. MindCORE provides administrative support and research opportunities for postdoctoral and graduate fellows, and summer research fellowships for undergraduate students. MindCORE provides undergraduate mentorship through the MindCORE Step-Ahead Mentorship Program (STAMP), which matches undergraduate students with a mentor who is a graduate student or postdoctoral fellow. MindCORE hosts regular workshops, lectures, research and professional development seminars, many of which are recorded and available to watch through the center's website.

Wharton Neuroscience Initiative

This effort led by Michael Platt, is a community of faculty, undergraduates, graduate and professional students, and staff interested in connecting brain science and business. The initiative seeks to develop future leaders at the nexus of business and brain science by linking Wharton, Penn alumni, business leaders, scientists, policy makers, and the public. Wharton Neuroscience Initiative Student Society (WiNSS) is a student group within the Wharton Neuroscience Initiative. Student members are undergraduates, MBA students, professional and graduate students across all disciplines within Penn's campus. WiNSS holds monthly meetings, hosts luncheons with companies, shares job opportunities, encourages involvement in research, and facilitates learning about how neuroscience and business can be connected and advocates for academic initiatives at the university level.

Center for Neuroscience and Society

This center focuses on the ethical, legal and social implications of neuroscience. Its seminar series provides neuroethics talks housed in an online video library, and contributes to training in Responsible Conduct of Research. Faculty include Dr. Jason Karlawish (PI).

The Brain Science, Translation, Innovation, and Modulation Center (brainSTIM Center)

This center provides leadership, education, and critical infrastructure to spur novel neuromodulation research aimed at better understanding and enhancing the capacities of the human brain and repairing brain function across a range of disorders including depression, anxiety, stroke, and dementia.

Translational Centers of Excellence (TCE) in Neurology

Center for Neurogenetics, run by Pedro Gonzoles Allegro, was formed in response to the emerging role that genetics, and epigenetics, are playing in the diagnosis and treatment of neurological disorders, and recognizing the fact that single genes may cause disorders in different parts of the neuraxis. Areas that have particularly advanced as a result of the clinical and research service include genetic counseling, epilepsy, Charcot Marie Tooth (CMT), Muscular Dystrophy (MD), Parkinson's and Huntington's Disease (HD) programs.

Center for Neuroengineering and Therapeutics (CNT), directed by Brian Litt, was created with the goal to create a broad interdisciplinary community to further the development of computational and bioengineering innovation to map brain activity and lead to the innovative diagnostic and treatment modalities for neuropsychiatric disorders. The CNT is working to develop and test new devices that can restore brain and nervous system function after it has been lost to disease or disability. The CNT also houses a T32 grant entitled "Training Grant in Neuroengineering and Medicine." The CNT is expanding its scope in translational work and giving rise to the Penn Center for Health, Devices and Technology (Penn Health-Tech), from its programs and staff.

Center for Neuroepidemiology, Health Care Outcomes and Disparities, directed by Allison Willis, is designed to provide the infrastructure for residents, fellows and faculty members to answer important questions pertaining to the health, care and outcomes of neurological conditions and neurological disease patients.

Center for Neurodegenerative Disease Research

CNDR promotes and conducts multidisciplinary research studies aimed at increasing our understanding of the causes and mechanisms that lead to brain dysfunction and degeneration in AD, Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS), frontotemporal lobar degeneration (FTLD), and other related neurodegenerative disorders that occur more frequently with advancing age. It conducts a weekly seminar series co-sponsored by the ADRC and open to the Penn community.

Frontotemporal Degeneration Center (FTDC)

FTDC conducts multidisciplinary patient-oriented clinical and basic science research to improve understanding of and develop better treatments for FTD patients, develop insights into mechanisms underlying FTLD-Tau and FTLD-TDP that can be translated into improved diagnostics and disease modifying therapies, and to serve the best interests of patients, caregivers-families and society in the most cost-effective and efficient manner possible.

Penn Program on Precision Medicine for the Brain (P3MB)

P3MB conducts research and scholarship to examine the ethical, legal and social issues encountered in the biomarker re-definition of brain diseases. Much of this work has focused on Alzheimer's disease and its redefinition with criteria such as the "A/T/(N) criteria." With expertise in ethics, geriatric medicine, law, philosophy, psychology, P3MB has examined how biomarker concepts affect adults' experiences of stigma and stereotyped threat, planning and future time perspective.

Penn Neurodegeneration Genomics Center (PNGC)

PNGC is directed by Dr. Gerard Schellenberg, studies genetics of Alzheimer's Disease and other related dementias. PNGC researchers apply high throughput genotyping and sequencing technologies to analyze tens of thousands of genomes and find novel genes. New experimental approaches, algorithms, and databases are developed in order to translate these findings into biological knowledge about the disease and new directions for drug discovery and preventive strategies. In collaboration with the Penn ADCC and Institute on Aging, the PNGC held a joint retreat in 2017 titled "Genetics of Aging-Related Neurodegeneration: The Sylvan M. Cohen Annual Retreat & Poster Session."

Translational Neuropathology Research Laboratory

The TNRL, directed by Dr. Eddie Lee, seeks to understand the molecular causes of age-related neurodegenerative diseases including AD, frontotemporal degeneration and amyotrophic lateral sclerosis using an interdisciplinary approach (molecular, biochemical, histologic, physiologic methods) to address the mechanisms of neurodegeneration. TNRL has identified genetic and epigenetic alterations associated with neurodegenerative disease inclusions using human tissues and experimental models including the identification of amyloid-responsive microglia in AD and the discovery of a novel autosomal dominant tauopathy.

The Inclusion, Diversity, Anti-Racism, and Equity in Neurology (IDARE Neurology) Program

The IDARE Neurology Program coordinates and implements the activities related to recruiting and retaining diverse talent, mitigating the effects of bias, and creating a culture of inclusion in the University of Pennsylvania Department of Neurology. This framework consists of four full committees devoted to (1) equity education, which includes anti-racism training; (2) recruitment and retention of underrepresented and disadvantaged persons across the entire career span; (3) community and social action, which includes promoting equity in the delivery of neurologic care; (4) intradepartmental equity, which includes the fair, affirming, and inclusive treatment of staff, trainees, and faculty. Currently the IDARE Neurology Program consists of over 55 members of the faculty, clinical trainees, and staff. Since the appointment of Dr. Hamilton as the inaugural Vice Chair of Inclusion and Diversity in 2017, Penn Neurology has moved toward more holistic residency application review practices, standardized and enforced its diversity practices for faculty searches, introduced a health equity curriculum for its residents and neurodisparity content in the medical student core clerkship, mandated implicit bias training for departmental leadership, and invited nationally recognized advocates for equity, diversity, and inclusion to speak at its Grand Rounds. Over the same period, our department has seen a doubling of UIM applications to our residency program, steady increase in UIM residents to over a third of the incoming class of 2020, and a doubling in UIM faculty who have achieved the rank of Associate Professor or higher, from 3 to 6. Penn faculty and residents provide care to Spanish-speaking, largely undocumented patients at two community clinics, Puentes de Salud in Philadelphia and Community Volunteers in Medicine in Chester County, Pennsylvania. In addition, for over 17 years, Penn Neurologists have been at the helm of the Pipeline Educational Program, which provides outreach to West Philadelphia high school students. Penn Neurology has played a leadership role in promoting the creation of diversity and inclusion programs in neurology departments across the country and in crafting the inclusion, diversity, anti-racism, and equity policies for the two largest professional societies for neurology in the US.

Office of Inclusion and Diversity (OID). Overseen by the inaugural Vice Dean for Inclusion and Diversity, Dr. Eve Higginbotham, the central mission of OID is to strengthen the quality of education, and to produce innovative research and models of healthcare delivery by fostering a vibrant inclusive environment and fully embracing diversity throughout Penn Medicine. This mission is realized by pursuing three main goals: recruiting outstanding talent, retaining a diverse community of faculty, staff and students, reaffirming the benefits of inclusion. OIDs strategic priorities include but are not limited to the following:

- Advancing implementation and utilization of diverse database of faculty candidates
- Increasing deployment of Unconscious Bias Workshops
- Inventory existing human capital resources
- Supporting diversity search advisors within departments
- Establishing a leadership program that affirms the principles of inclusion
- Determining the financial impact of addressing disparities across Penn Medicine
- Enhancing the infrastructure to support the acquisition of K and R awards among Fellows and Junior Faculty
- Increasing student and faculty satisfaction
- Increasing women and diverse faculty compared to the three-year rolling average
- Expanding efforts in the community related to inclusion, diversity, and health equity

FOCUS on Health & Leadership for Women

Housed within the OID, FOCUS is designed to improve the recruitment, retention, advancement and leadership of women faculty, and to promote women's health research. FOCUS collaborates with other medical schools, universities, national committees, and Women in Medicine programs in order to explore institutional change that fosters a more diverse faculty in the community of academic medicine. FOCUS works to achieve these goals through: professional development and leadership mentoring initiatives; opportunities for networking to assist women in all ranks, tracks and stage of career in establishing multiple mentors and peer support teams; obtaining extramural funds to offer seed grants and fellowships that stimulate research focused in women's health while concomitantly supporting the career development of Penn medical students and faculty investigators; individual mentoring of biomedical faculty at Penn; conducting grant funded research on women's biomedical careers and faculty development; and providing national leadership on advancing women in medicine through invited lectures and research presentations and publications.

Program for Diversity and Inclusion (PDI)

Operating within the Academic Programs Office of the Perelman School of Medicine (PSOM), PDI supports the educational mission of PSOM by promoting an inclusive, welcoming, supportive and engaged medical student community. The PDI is comprised of an Associate Dean and three Assistant Deans, the PDI pursues activities that advance its four principle missions: (1) promote and support a diverse student body; (2) support student-led cultural affinity groups; (3) foster the emotional wellness of the students; (4) facilitate students' participation in community health and community engagement programs.

Alliance of Minority Physicians

The UPHS-CHOP Alliance of Minority Physicians (AMP) is a coalition of the University of Pennsylvania Health System (UPHS) Hospitals and The Children's Hospital of Philadelphia (CHOP). It was founded in the spring of 2012 to fulfill a need identified by the Perelman School of Medicine Plan for Faculty Diversity and Inclusion. The mission of AMP is to develop leaders in clinical, academic, and community medicine through active recruitment, career development, mentorship, social opportunities and community outreach geared towards underrepresented faculty, house staff, and medical students at UPHS, CHOP, and the Perelman School of Medicine. *Roy Hamilton* has been a faculty member within AMP since its inception and has previously served on AMPs executive board. AMP supports a large range of activities, an overview of which is as follows:

- **UIM Recruitment:** Maintaining the pipeline of competitive, driven under-represented in medicine (UIM) students, residents, and fellows who are educated and trained in our academic centers is one of the central objectives of AMP. AMP pursues a variety of recruitment activities, including but not limited to attending conferences sponsored by the Student National Medical Association and Latino Medical Student Association (UIM medical student organizations), directly engaging potential medical students, interns, residents, and fellows who are applying to training programs at Penn/CHOP, and sponsoring a UIM Visiting Clerkship Program.
- **Career Development:** AMP sponsors various educational workshops throughout the academic year designed to enhance our members' knowledge of how to succeed in academic medicine, sharpen their skills for grant and journal writing and research, and foster mentoring relationships.
- **Mentoring Families:** AMP employs the framework of Mentoring Families to enhance the community of underrepresented minority physicians in the UPHS and CHOP systems. Each of the 12 families is composed of 12 to 15 talented medical students, residents, fellows, and attending faculty with a wide range of interests and accomplishments. The families serve as a support system, and contribute to each member's professional development throughout the year. Each of the 12 Mentoring Family groups is named after an underrepresented minority historical figure who became a pioneer in the field of medicine.
- **Social Engagement:** AMP facilitates a range of events throughout the year to promote connections amongst faculty, housestaff, and trainees. Regular programming includes a graduation celebration for residents and fellows, a Welcome Back! Reception for returning trainees, welcome dinners and happy hours for visiting clerkship students, speed mentoring sessions with trainees and faculty, and an annual cookout with current & prospective UIM students at the Perelman School of Medicine.

The Penn Artificial Intelligence and Technology (PennAITech) Collaboratory

Request for Applications

Aging Focus Pilot Program (2021-2022) Alzheimer's Disease and Related Dementias (ADRD) Pilot Program (2021-2022)

PURPOSE: Our two Pilot Cores invite applications for pilot studies using technology and artificial intelligence (AI) to optimize care management and health outcomes for older Americans, including those with Alzheimer's Disease and Related Dementias (ADRD) living in their homes independently, and those receiving clinical care or skilled home and community-based services.

The goals of this pilot program are to:

- 1) Solicit, select, and manage pilot studies that develop or test technology and AI to detect risk, predict needs, address disparities, improve access to care, and support decision making for chronic illness management and safe aging in place for older adults with or without ADRD and their caregivers.
- 2) Foster collaborations among affiliated Penn investigators and a network of scientists and clinicians in peer institutions, research centers, industry partners and home and community-based services.

ELIGIBILITY: We invite applicants from academia, industry, and clinical practice based in the United States. Applicants from under-represented racial and ethnic groups as well as individuals with disabilities are strongly encouraged to apply for funding.

Examples of Pilot Study Topics:

The request for applications seeks innovative studies that develop or use technology or AI products in home and community-based and clinical settings that detect risk, predict needs, address disparities, improve access to care, and support decision making to improve the health and well-being of older Americans. Examples include pilot studies that:

- Develop new or deploy existing telehealth technologies in rural, underserved, or disabled populations to improve access to care, chronic illness management, or caregiver support.
- Leverage electronic health record databases and in-home sensor or video technologies to build and test AI algorithms to detect risk and prevent adverse events such as falls, medication interactions or non-adherence, functional or cognitive decline, nutritional deficits, sleep disruption, financial security threats, isolation, or other geriatric syndromes.
- Evaluate the feasibility, acceptability, and impact of AI and technology applications to predict physical, social, emotional, or financial needs of aging adults or their caregivers living in home or community-based settings.



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<https://www.pennaitech.org>



Artificial Intelligence and
Technology Collaboratory
for Healthy Aging

- Apply AI to detect and alert providers to disparities in services or outcomes among older adults aging in home or community-based settings.
- Develop or deploy decision support tools to assist older adults, family caregivers or providers in shared decision making regarding healthy aging, chronic illness management, financial security, palliative care, end of life planning, and transitions in care and living arrangements.
- Develop innovative AI driven devices for commercialization that support healthy and safe aging in place for home or community-based older adults and their caregivers.
- Create or apply technologies that support formal or informal caregivers in providing care for older adults in the home or community-based settings including improvements in health literacy, decision making, caregiving, and communication.
- Create or test AI or information technologies that bridge communication between home health and other health care providers to support decision making.
- Conduct end-user evaluations of AI and other technologies to inform redesign, implementation, or commercialization.

Investigators interested in applying are strongly encouraged to visit the PennAITech website www.pennaitech.org for more information (and follow us on Twitter @pennaitech). A list of core leaders and resources is provided on our website. You can also email us with questions at pennaitech@nursing.upenn.edu

An optional informational webinar will be hosted to provide investigators with an overview of application details and support that the PennAITech can provide in assistance with resources for conducting the pilot (e.g., core facilities, clinical sites, data analytic methods and platforms, AI tools, etc.). Investigators will have the opportunity to ask questions. These webinars will be recorded and posted online at <http://www.pennaitech.org>

HOW TO APPLY: Interested applicants should submit a completed application at:
<https://www.a2collective.ai/pilotawards>

by February 18, 2022. Please indicate the population of focus: Aging Pilot Core or ADRD Pilot Core. Proposals will be reviewed and applicants who have submitted highly rated proposals will be invited for a presentation and Q&A if reviewers have additional questions. Final selections will be made thereafter. Proposals that will be selected for funding will be required to submit additional documentation to NIH including a detailed budget, a project management plan, human subjects' protections information (if applicable) and recruitment criteria, and other information.

We encourage pilot investigators to leverage the cores, state-of-art research facilities, informatics and geriatric resources provided by the PennAITech. The Collaboratory will provide guidance for investigators regarding the design and conduct of interdisciplinary pilot projects that address stakeholder needs and leverage promising technologies through core functions including the Stakeholder Engagement Core, the Ethics and Policy Core, the Clinical Validation and Translation Core, the Technology Selection Core and the Networking and Education Core. Learn more at [https://www.pennaitech.org](http://www.pennaitech.org)



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Applicants may work with collaborators and home and community-based organizations of their choosing. PennAITech has already established the support of the following organizations as potential project sites:

- 1) The *Visiting Nurse Service of New York (VNSNY)* the largest not-for profit home health agency in the US serving 35,000 patients per day in all 5 boroughs of New York City.
- 2) *Managed Long Term Services and Supports (MLTSS)* refers to the delivery of long-term services and supports through capitated Medicaid managed care programs. Forty-one programs are operated in 24 states. The New York State Department of Health has a robust network of MLTSS plans, one of the largest, the CHOICE Program located at the Visiting Nurse Service of New York in New York City currently serves 20,385 chronically ill or disabled New Yorkers deemed nursing home eligible.
- 3) The *Program of All-Inclusive Care for the Elderly (PACE)* is a community-based, national program with locations serving low-income older adults who are certified as needing nursing home level of care, assistance with their activities of daily living and on average have 5.8 chronic health conditions; almost half have a diagnosis of dementia. Programs nationwide serve 53,000 adults age 55 and older with 94% living in the community.
- 4) The *LHC Group* is a leading national provider of in-home healthcare services with 32,000 employees operating in 35 states reaching 60% of the US population aged 65 and older.
- 5) *Trinity Health* is one of the largest multi-institutional Catholic health care delivery systems in the nation, serving diverse communities that include more than 30 million people across 22 states. Trinity Health includes 92 hospitals, as well as 106 continuing care locations that include PACE programs, senior living facilities, and home care and hospice services committed to those who are poor and underserved.

DEADLINES:

- | | |
|---------------------------------------|---------------------------------|
| • Applications open: | January 10, 2022 |
| • Applications due: | February 18, 2022, by 5:00pm ET |
| • Announcement of Conditional Awards: | March 31, 2022 |
| • Package submission to NIA: | April 30, 2022 |
| • Final Award Date: | May 31, 2022 |
| • Project Completion: | up to May 31, 2023 |





Proposal submissions will be evaluated on the following criteria:

Fit with the PennAI Tech Collaboratory themes of using technology and artificial intelligence to optimize health and care management for older adults living in their homes.	Overall impact, plus standard NIH evaluation criteria: significance, investigators, innovation, approach, and environment
Potential to lead to future funding for commercialization, effectiveness and/or implementation trials.	Feasible for completion within 6-12 months
Inclusion of team members from multiple disciplines	Appropriateness of the budget and timeline

Maximum Budget: Aging Pilot: up to \$200,000 in direct costs; ADRD Pilot: up to \$200,000 in direct costs

We anticipate funding at least ten pilots. Although most projects will be funded for a 12-month period with a maximum budget of \$100,000 in direct costs, higher levels of funding (i.e., up to \$200,000 in direct costs) and two-year projects will also be considered with appropriate justification. Applicants focusing on the general older adult population should apply to the Aging Pilot category; applicants focusing on older adults with ADRD specifically should apply to the ADRD Pilot category.

This RFA is funded by the National Institute of Aging (*P30AG073105*). Please use guidance set forth by NIH [here](#) regarding unallowable expenditures when building your budget.

Other Requirements A one-page annual progress report must be submitted by December 1, 2023 that includes a description of the project's specific aims, significance, summary of the research conducted and results found to date, total enrollment, and future plans.

