

Artificial Intelligence and Technology Collaboratory for Healthy Aging

Newsletter - September 2023 - Issue 5







Welcome to PennAlTech

We are welcoming you to our fifth newsletter of the Penn Artificial Intelligence and Technology Collaboratory for Healthy Aging (PennAlTech). PennAlTech, funded by the National Institute on Aging, is committed to developing, evaluating, commercializing, and disseminating innovative technology and artificial intelligence systems to support older adults and those with Alzheimer's Disease and Related Dementias. Our Year 3 pilot award competition is underway; we just completed the first phase and are about to enter the next phase. This national pilot competition gives an opportunity to identify innovative projects that have the potential to make a difference in the lives of older adults and those with Alzheimer's Disease and Related Dementias and their families.

We have started facilitating sessions with various stakeholder groups providing an opportunity for our pilot awardees to discuss their ideas and project updates with representatives from diverse stakeholder groups (including clinicians, older adults and family members). These discussions have provided valuable feedback that can inform the redesign, implementation and evaluation of these innovative technologies and projects.

After the successful completion of our first-year webinar series, we are now launching the second webinar series for 2023-2024; as before all recorded sessions will be available on our YouTube channel. We have invited international experts in gerontology, informatics, AI, ethics, and dementia to showcase cutting edge research and explore challenges and opportunities for the future. In this issue we feature Dr. Dawn Mechanic-Hamilton. We also learn more about Bestie Bot and USC. We provide updates from the field and latest news. As always, we invite you to follow our social media platforms, including our <u>YouTube channel</u> and reach out with any questions or suggestions.



Welcome

Meet our Team

Team Member Spotlight

Yr1 Pilots

Pilot Spotlights

News from the Field

Publications

Save-the-date: 2024 a2 National Symposium in Philadelphia

Stakeholder Recruitment

Connect with Us



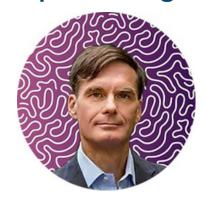
George Demiris

Meet the Team

Principal Investigators



George Demiris, PhD, FACMI



Jason Karlawish, MD



Jason H. Moore, PhD, FACMI

Aging Focus Pilot Core



Kathryn H. Bowles PhD, FACMI, FAAN



Pamela Z. Cacchione, PhD, CRNP, FAAN

AD/ADRD Focus Pilot Core



Lauren Massimo PhD, CRNP



Dawn Mechanic-Hamilton, PhD

The overarching goal of the Aging Focus Pilot Core is to promote the advancement of science using technology and artificial intelligence to optimize quality of life and healthcare management for older adults living in their homes independently, as well as those receiving skilled home and community-based services. This Core solicits, selects, and manages pilot studies that develop or test AI and technology applications to detect risks, predict needs, address disparities, improve access to care, and support decision making for chronic illness management and safe aging in place.

The overarching goal of the Alzheimer's Disease and Alzheimer's Disease Related Dementias (AD/ADRD) Focus Pilot Core is to promote the advancement of science and engineering for predictive analytics, clinical decision support, or the care of adults with AD/ADRD. This Core solicits, reviews, and supports pilot studies that develop or advance the use of Al and technology for AD/ADRD predictive analytics, clinical decision support, or the care of adults with AD/ADRD.

Meet the Supporting Core Team

The overarching goal of the Networking and Mentoring Core is to support activities intended to facilitate networking and mentoring for the awardees of the Aging and AD pilot projects, all of whom are invested in Artificial Intelligence (AI) approaches and technology for aging adults, including those with Alzheimer's disease or related dementias (AD/ADRD).

This Core organizes and supports consortium networking activities and communicates with the broader scientific community.

Networking and Mentoring Core



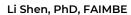


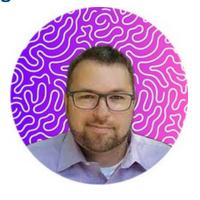
Marylyn D. Ritchie, PhD

Roy Rosin

Technology Identification and Training Core







Ryan Urbanowicz, PhD

The overarching goal of the Technology Identification and Training Core is to use evidence from the literature, stakeholder and expert inputs to identify the technology needs of older Americans, as well as develop training activities for artificial intelligence (AI) and technology for scientists, engineers, clinicians, medical professionals, patients, policy makers, and investors.

Ethics and Policy Core



Emily Largent, JD, PhD, RN



Anna Wexler, PhD

The overarching goal of the Ethics and Policy Core is to shift the current ethics and policy paradigm by focusing on issues that arise at the intersection of aging and of Al methods and technologies for healthy aging. The Core will work in close collaboration with the other PennAlTech Collaboratory Cores to address four key issues: (1) promoting the autonomy of older adults by balancing considerations of usefulness and intrusiveness; (2) protecting older adults in light of vulnerability due to cognitive and functional decline; (3) mitigating bias and addressing health disparities, such as racial disparities and urban-rural disparities; and (4) safeguarding the data privacy of older adults.

The goal of the Clinical Translation and Validation Core is to use the science and practice of geriatrics and gerontology to assess the feasibility and clinical utility of artificial intelligence (AI) methods for clinical decision support and of new technology for monitoring aging adults in their home. This Core provides an expert panel to assess the feasibility and clinical value of new artificial intelligence models for predictive analytics and clinical decision support and of new technologies designed to monitor aging adults and those with AD/ADRD. It provides a testbed for new technologies designed to monitor aging adults and those with AD/ADRD with an emphasis on underserved and rural populations.

Clinical Translation and Validation Core





Jason Karlawish, MD

Rebecca T. Brown, MD, MPH

The overarching goal of the Stakeholder Engagement Core (SEC) is to ensure that technology solutions and AI approaches proposed and developed by the PennAlTech Collaboratory are maximally adoptable by and accessible to their end users by soliciting ongoing stakeholder input and involving all key parties throughout all phases of the development and testing processes. The Core maintains a technology consortium (consisting of technology companies, startups, venture capital firms, and angel investors) that provide guidance and collaboration opportunities for pilot projects and a platform for potential dissemination and commercialization of innovative tools.

Stakeholder Engagement Core





George Demiris, PhD, FACMI

Lisa M. Walke, MD, MSHA



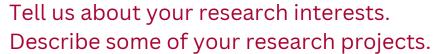
John Holmes, PhD, FACE, FACMI

The Internal Advisory Board (IAB) plays an important role in providing Internal Advisory Board (IAB) perspective and detailed advice and recommendations to the leadership team and the core directors. The IAB is chaired by Dr. John Holmes who is a Professor of Informatics and Epidemiology with significant experience in artificial intelligence and clinical decision support. We have assembled a team of local Penn experts representing three key areas of expertise. The first area, Biomedical Informatics and Artificial Intelligence, includes Drs. John Holmes (Professor of Informatics, AI expert), Ross Koppel (Professor of Sociology, EHR expert), Konrad Kording (Professor of Computer Science and Neuroscience, AI expert), Insup Lee (Professor of Computer Science and Engineering) and Danielle Mowery (Chief Research Information Officer). The second area, Geriatrics and Medicine, includes Drs. Mark Neuman (Anesthesiologist specializing in older adults), Matt Press (Medical Director of Primary Care), and Ramy Sedhom (Palliative Care, Geriatric Oncology, Penn Medicine Princeton Health). The third area, Home Care, includes Danielle Flynn (Director, Penn Medicine Home Health), Nancy Hodgson (Professor of Nursing), Bruce Kinosian (Division of Geriatrics), and Brian Litt (Director, Penn Center for Health, Devices, and Technology).

TEAM MEMBER SPOTLIGHT:

Dawn Mechanic-Hamilton, PhD

Assistant Professor, Department of Neurology Chief, Division of Neuropsychology





My research focuses on cognitive assessment and behavioral intervention in AD/ADRD. We are developing and testing a suite of digital cognitive tasks aimed at improving early detection of cognitive decline in those at risk for AD/ADRD. Integrating technology into cognitive assessment has the potential to add to the reliability and validity of the data, increase access through remote assessment, and more readily detect patterns of change. Through my work as the Co-Lead of the Clinical Core in Penn's Alzheimer's Disease Research Center, I work with a multidisciplinary team to study cognitive aging in individuals with and without cognitive impairment, with a focus on enrollment of individuals historically underrepresented in research and the collection of Social and Structural Determinants of Health data to better understand how life course experiences influence cognitive aging. My intervention work started with developing group-based behavioral interventions for individuals living with cognitive impairment and has evolved to include an app-based intervention for increasing goal-directed behavior in collaboration with my PennAlTech ADRD Pilot Core Co-Lead, Dr. Lauren Massimo.

What is your role within PennAlTech?

I Co-Lead the ADRD Pilot Core with Dr. Lauren Massimo.

What do you see as the role of artificial intelligence and technology in biomedicine and health care in the next few years?

My hope for the integration of AI and technology in healthcare is that it will leverage pattern detection, innovative algorithms, and user-friendly interfaces to improve the speed and accuracy of diagnosis, personalize treatment options, and reduce bias and inequity in healthcare delivery. Each of these application areas have challenges and it will take partnership with all stakeholders to ensure that the data is representative and generalizable and that the interventions are feasible and acceptable. Relevant and meaningful solutions require team science, and this is especially important during the fast-paced development of AI and other technology-based solutions.

What advice do you have for innovators and entrepreneurs who are embarking on works harnessing the potential of AI or other technologies for aging?

My advice is to find out what is and is not working for patients, care partners, and clinical teams and use that feedback as a jumping off point for where to focus on making meaningful change. Identify and use the unique advantages of technology to fill in gaps and address unmet needs. Form a team and combine the strengths of the human expertise with innovative technological approaches to create impactful solutions.

CLICK HERE TO LEARN MORE ABOUT OUR 2022-2023 PILOT AWARDEES



Desh Mohan
Patient-Surrogate
Alignment in Digital
Advance Care Planning
Koda Health



Robin Austin
Designing Usable
Technologies via DataDriven Whole-Person
User Personas
University of Minnesota



Richard Everts

RGBd + Thermal

Computer Vision Platform
for Home Monitoring and

Telehealth

Bestie Bot



Robin Brewer
Conversational Care
Technologies
University of Michigan



David Yonce
Physiological Detection
and Monitoring of
Alzheimer's Disease
Cogwear



David Stout
Al-Assisted Fall Detection
and Remote Monitoring
for Seniors with ADRD
Iris Technology Inc



Lorens Helmchen
Al-Enabled Conversations
to Manage Psychotropic
Medication
The George Washington
University



Veerawat
Phongtankuel
Detecting respiratory
distress in patients with
advanced ADRD
Weill Cornell Medicine



Emma Rhodes
Feasibility of Digital
Monitoring to Detect
Autonomic Markers of
Empathy Loss in bv FTD
University of Pennsylvania



Maja Mataric
An Accessible Machine
Learning-based ADRD
Screening Tool for
Caregivers
University of South California



Kendra Ray
A Music-Based Mobile App
to Combat
Neuropsychiatric
Symptoms in People
Living With ADRD
AutoTune Me



Jennifer Portz
Leveraging Patient
Portals to Support
Caregivers
University of Colorado/
Kaiser Permanente

PILOT IN THE **SPOTLIGHT:**

RGBd + Thermal Computer Vision Platform for Home Monitoring and Telehealth

Richard Everts

CEO, Co-Founder **Bestie Bot**



TELL US ABOUT YOUR PROJECT AND WHAT YOU PLAN TO DO THIS NEXT YEAR.

We're building a custom camera system using thermal and other sensors to manage and predict environmental events. Combining these cameras with our patented Erana Engine and custom AI networks, we will safely predict falls during day or night, provide basic mobility testing, and remote temperature check for telehealth. By the end of our work this year, the systems will be ready for beta testing in homes.

We're creating a passive system for monitoring that represents the cutting edge of spatial Al. Apple will put this into the public consciousness more with their Apple Vision Pro in 2024. We're just a little ahead of the curve, but get ready to hear much about spatial AI in 2024.

WHAT ARE THE LONG TERM GOALS FOR YOUR RESEARCH?

Based on our current research and experimental data, we have unique insights into AGI and will deploy them into embodied agents in individuals' homes, or into the sensors themselves. The technology is not yet ready, but a simulacra version will be in the near future.

HOW DO YOU ENVISION THE ROLE OF AI AND TECHNOLOGIES IN SUPPORTING AGING?

Over the next decade alone, new tools and products will enable predictive capabilities for individuals in the home and manage day-to-day living. However, new and unique abilities will come from synthesizing all the data generated separately by multiple devices from different manufacturers into a unified experience. One of those capabilities will be social, and the other will be safety.

Each individual will have their own AI trained around their lives and actions for social capabilities. While current systems still suffer various challenges, young technologies challenging the recent splurge on LLMs will change how we think of information and language. With advancements in power and architecture, by the end of the decade, AI will be advanced enough to help offset cognitive decline in those with early dementia.

For safety, the home will manage itself without much technical knowledge. Simple systems that already do this, like Nest, will be far more advanced in the coming years. Sensors and more that utilize spatial AI techniques, such as mapping where someone is in space, will be essential to new forms of Al networks and safety procedures.

While these are undoubtedly two of the top changes, there are many more that a customized AI that individuals take with them will provide. Health records. Predictive medicine. Medication compliance. **bestie**bot

Things are just getting started.

PILOT IN THE SPOTLIGHT:

An Accessible Machine
Learning-based ADRD
Screening Tool for Families
and Caregivers



PI: Maja Matarić
Chan Soon-Shiong Distinguished
Professor of Computer Science,
Neuroscience and Pediatrics
University of Southern California



Co-I: Jesse Thomason
Assistant Professor
University of Southern California

TELL US ABOUT YOUR PROJECT AND WHAT YOU PLAN TO DO THIS NEXT YEAR.

We are working with patients that visit the USC Alzheimer Disease Research Center (ADRC) to build machine learning-based models to detect the emergence of symptoms of dementia based on carrying out commonly-used dementia screening diagnostics on an accessible tablet device. Today, patients need to make a visit to a clinician to be screened for the presentation of dementia symptoms; the inconvenience and costs of such visits can mean patients are screened infrequently, even if their risk for developing Alzheimer's disease and related dementias (ADRD) is high. Our goal this year has been to build a system to conduct screening tests conveniently and without the need for an in-person clinician, so that patients and caregivers can screen for early signs of ADRD at home. Informed by data from nearly 40 patients so far from our ADRC, we are developing machine learning ADRD detection models that consider how the patient talks, looks at, and draws on a tablet device that administers standard ADRD diagnostic screening tests.

USC Viterbi

School of Engineering



Click to learn more about the program here!

WHAT ARE THE LONG TERM GOALS FOR YOUR RESEARCH?

A reliable, automated screening system for dementia that can be taken at home, without a visit to a clinician, would mean patients and caregivers can initiate self-conducted screenings without travel or financial burden. More frequent, inexpensive screening can mean earlier detection of ADRD; and our tool may enable patients to seek clinical interventions early, increasing the chance that the ADRD symptoms can be managed and mitigated before they become more severe. Long-term, we'd like to embody such screening through socially engaging assistive robots that act as companions in the home. Such socially assistive robots will actively engage patients in conversation and initiate games that approximate formal screening tests, all while collecting signals from the patient over time that could provide vital, early detection of ADRD symptoms in time for intervention.

HOW DO YOU ENVISION THE ROLE OF AI AND TECHNOLOGIES IN SUPPORTING AGING?

Automated ADRD symptom detection may support an aging population by reducing the need for frequent in-person clinical visits while increasing the likelihood of early dementia detection. Existing work on automatic screening is limited, and typically considers patient performance on a single task or kind of data, such as their speech during a diagnostic screening, which can lead to less reliable predictions subject to more noise and individual variation. Our key insight is to conduct multiple diagnostic screenings and capture multiple modalities of patient input during that process. For example, when patients are tasked with describing details in a picture, we can consider not just their speech but their eye gaze patterns as they study and speak about the image contents. By collecting data from multiple modalities, we can use machine learning to build predictive models that look for signs of dementia while corroborating evidence across speech, gaze, and motor signals to yield more reliable indicators.

NEWS FROM THE FIELD

WHAT'S HAPPENING IN AI?

Al Chatbots for Cancer Treatment

A study by a research group from Brigham and Women's Hospital, examined how large language models could be used to support cancer treatment recommendations. They specifically assessed how consistently anartificial intelligence chatbot provides recommendations for cancer treatment that align with National Comprehensive Cancer Network (NCCN) guidelines. The study pubished in JAMA Oncology demonstrates that in approximately one-third of cases, ChatGPT 3.5 provided an inappropriate ("nonconcordant") recommendation, demonstrating the current limitations of such Al tools. You can read the full study here:

https://jamanetwork.com/journals/jamaoncology/fullarticle/2808731

ChatGPT and Scientific Articles

A study by Dr Martin Májovský and colleagues demonstrated that artificial intelligence (AI) language models such as ChatGPT have the potential to generate fraudulent scientific articles that appear remarkably authentic. This discovery calls for a careful examination of the role of LLMs and their impact on the integrity of scientific research and the trustworthiness of published papers. The paper describing the study findings can be found here:

https://www.jmir.org/2023/1/e46924/

Low-Cost Smartphone Attachment Introduces Opportunities for Blood Pressure Monitoring

An engineering team at the University of California San Diego developed an ultra-low cost home blood pressure monitor that uses a smartphone's camera and flash to monitor blood pressure at the user's fingertip. The clip works with a custom smartphone app and currently costs about 80 cents to make. The researchers estimate that the cost could be further decrease to as low as 10 cents per unit when manufactured at scale. The paper describing the system's performance and hardware can be found here:

https://www.nature.com/articles/s41598-023-34431-1

Governing use of AI in Electronic Health Records

The Office of the National Coordinator (ONC) for Health Information Technology is exploring the mandate of a "nutrition label" for artificial intelligence use in the electronic health record systems it vets. ONC aims to introduce the final rule out as soon as possible. The proposal already released for solicitation of comments would require electronic health record systems that use AI to provide users with information about how that technology works, including a description of the data that are being used. The proposed rule can be found here:

SELECTED PUBLICATIONS

WORK BY OUR TEAM

01.

A retrospective cohort analysis leveraging augmented intelligence to characterize long COVID in the electronic health record: A precision medicine framework.

Strasser ZH, Dagliati A, Shakeri Hossein Abad Z, Klann JG, Wagholikar KB, Mesa R, Visweswaran S, Morris M, Luo Y, Henderson DW, Samayamuthu MJ; Consortium for Clinical Characterization of COVID-19 by EHR (4CE); Omenn GS, Xia Z, **Holmes JH**, Estiri H, Murphy SN. PLOS Digit Health. 2023 Jul 25;2(7):e0000301. doi: 10.1371/journal.pdig.0000301. eCollection 2023 Jul. PMID: 37490472

03.

Physician-Investigator, Research Coordinator, and Patient Perspectives on Dual-Role Consent in Oncology: A Qualitative Study.

Morain SR, Barlevy D, Joffe S, **Largent EA**. JAMA Netw Open. 2023 Jul 3;6(7):e2325477. doi: 10.1001/jamanetworkopen.2023.25477. PMID: 37490290

05.

Opportunities and challenges for biomarker discovery using electronic health record data. Singhal P, Tan ALM, Drivas TG, Johnson KB, **Ritchie MD**, Beaulieu-Jones BK. Trends Mol Med. 2023 Sep;29(9):765-776. doi: 10.1016/j.molmed.2023.06.006. Epub 2023 Jul 18. PMID: 37474378

02.

Development of complemented comprehensive networks for rapid screening of repurposable drugs applicable to new emerging disease outbreaks.

Nam Y, Lucas A, Yun JS, Lee SM, Park JW, Chen Z, Lee B, Ning X, **Shen L**, Verma A, Kim D. J Transl Med. 2023 Jun 26;21(1):415. doi: 10.1186/s12967-023-04223-2. PMID: 37365631

04.

Using multiple qualitative methods to inform intervention development: Improving functional status measurement for older veterans in primary care settings.

Nicosia FM, Zamora K, Rizzo A, Spar MJ, Silvestrini M, **Brown RT**. PLoS One. 2023 Aug 24;18(8):e0290741. doi: 10.1371/journal.pone.0290741. eCollection 2023. PMID: 37616266

06.

ChatGPT and large language models in academia: opportunities and challenges.

Meyer JG, **Urbanowicz RJ**, Martin PCN, O'Connor K, Li R, Peng PC, Bright TJ, Tatonetti N, Won KJ, Gonzalez-Hernandez G, **Moore JH**. BioData Min. 2023 Jul 13;16(1):20. doi: 10.1186/s13040-023-00339-9. PMID: 37443040

PUBLICATIONS

07.

Social Risk Factors are Associated with Risk for Hospitalization in Home Health Care: A Natural Language Processing Study.

Hobensack M, Song J, Oh S, Evans L, Davoudi A, **Bowles KH**, McDonald MV, Barrón Y, Sridharan S, Wallace AS, Topaz M. J Am Med Dir Assoc. 2023 Aug 5:S1525-8610(23)00621-7. doi: 10.1016/j.jamda.2023.06.031. Online ahead of print. PMID: 37553081

08.

The lived experience of reconstructing identity in response to genetic risk of frontotemporal degeneration and amyotrophic lateral sclerosis. Dratch L, Owczarzak J, Mu W, Cousins KAQ, **Massimo L**, Grossman M, Erby L. J Genet Couns. 2023 Jul 10. doi: 10.1002/jgc4.1749. Online ahead of print. PMID: 37424394

09.

Mild Cognitive Impairment is Associated with Poorer Everyday Decision Making. Fenton L, Han SD, DiGuiseppi CG, Fowler NR, Hill L, Johnson RL, Peterson RA, Knoepke CE, Matlock DD, Moran R, **Karlawish J**, Betz ME. J Alzheimers Dis. 2023;94(4):1607-1615. doi: 10.3233/JAD-230222. PMID: 37458034

10.

Pain Management Education for Rural Hospice Family Caregivers: A Pilot Study With Embedded Implementation Evaluation.

Starr LT, Washington KT, Jabbari J, Benson JJ, Oliver DP, **Demiris G**, Cagle JG. Am J Hosp Palliat Care. 2023 Jul 25:10499091231191114. doi: 10.1177/10499091231191114. Online ahead of print. PMID: 37491002

11.

Contributions of neighborhood social environment and air pollution exposure to Black-White disparities in epigenetic aging. Yannatos I, Stites S, **Brown RT**, McMillan CT. PLoS One. 2023 Jul 5;18(7):e0287112. doi: 10.1371/journal.pone.0287112. eCollection 2023. PMID: 37405974

12.

Predicting emergency department visits and hospitalizations for patients with heart failure in home healthcare using a time series risk model. Chae S, Davoudi A, Song J, Evans L, Hobensack M, **Bowles KH**, McDonald MV, Barrón Y, Rossetti SC, Cato K, Sridharan S, Topaz M. J Am Med Inform Assoc. 2023 Jul 11:ocad129. doi: 10.1093/jamia/ocad129. Online ahead of print. PMID: 37433577













The a2 Collective National Symposium is primarily funded by the National Institute on Aging, part of the National Institutes of Health.

We look forward to welcoming you to Philadelphia in March 2024!



Registration details to follow soon.

Our webinar series begins again on September 7:



Accelerating Regional Readiness for Aging: Exploring Healthspan Innovation Hubs

> Brendan McEntee Meredith Benedict

MITRE ENGENUITY
A Foundation for Public Good

THURSDAY, SEPTEMBER 7
12-1PM EST



Click HERE for Full Series
Webinar Information



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funded by the National Institute on Aging Grant Nr. P30AG073105

WEBINAR SERIES 2023-2024



The purpose of this webinar series is to foster a dialogue exploring clinical, ethical and technological opportunities and challenges associated with the use of technology to promote aging, and to introduce different perspectives at the intersection of informatics and gerontology.



September 7, 2023
Brendan McEntee
MITRE



October 5, 2023

Matthew McCoy

University of Pennsylvania



November 2, 2023 Constantin Aliferis University of Minnesota



Ab Brody
New York University



January 4, 2024 Yuri Quintana Harvard University



February 1, 2024
Sean Mooney
University of Washington



March 7, 2024 Irene Y. Chen UC Berkeley



April 4, 2024
Anne Turner
University of Washington



May 2, 2024
Sophie Scott
University College London

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Series HERE



June 6, 2024
Fei Wang
Weill Cornell Medicine

www.pennaitech.org

funded by the National Institute on Aging Grant Nr. P30AG073105

Tune in first Thursdays at 12PM ET through June.



Matthew McCoy

Assistant Professor Department of Medical Ethics and Health Policy University of Pennsylvania

THURSDAY, OCTOBER 5 12-1PM EST





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Technology solutions may prove to be useful in helping people age independently and stay safe at the residence of their choice, manage their health care needs and communicate with family members and health care providers. The *Penn Artificial Intelligence and Technology Collaboratory for Healthy Aging* (PennAlTech) is a program that fosters innovation to support aging. We are looking for <u>family caregivers</u>, namely, adults who are taking care of a loved one, relative or friend who is over the age of 65 years, to participate in our stakeholder engagement group and give us feedback about many different ideas and projects. No previous experience with technology is necessary. We will provide remuneration at \$50 per hour, and anticipate participation for up to 10 hours per year based on interest and availability.

For more information, please contact:

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Phone: 215-746-8361





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