

Penn
UNIVERSITY OF PENNSYLVANIA

Artificial Intelligence and
Technology Collaboratory
for Healthy Aging

Newsletter - August 2025 - Issue 13



We are welcoming you to our 13th newsletter of the Penn Artificial Intelligence and Technology Collaboratory for Healthy Aging (PennAITech). PennAITech, 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. We have just completed our Year 5 pilot award competition and will be announcing our next cohort of awardees shortly. You can see a quick synopsis of our Year 4 awardees by following the link to the [Year 4 Look Book](#) included on page 7.

We provide a summary of our [Summer Innovation Institute](#) that we successfully held June 22-27. The Summer Innovation Institute is a multi-day, in-person intensive workshop held annually, and allows participants to explore design thinking and equity-centered design by collaboratively putting them into practice. Many of our Year 4 pilot awardees had the opportunity to participate and learn from experts in both aging and innovation.

In this newsletter we highlight selected activities and resources within our Collaboratory. We feature PennAITech Innovation Fellows Tianhua Zhai and Yoonjae Lee. PennAITech is committed to mentoring and facilitating research and educational opportunities for our Innovation Fellows. We also learn more about Year 3 pilot projects by our awardees at the Beth Israel Deaconess Medical Center, DreamFace Technologies and Aliviado/New York University.

Caregivers of older adults play a critical role in the delivery of clinical and supportive services to older adults themselves and are an invaluable component of our health care system. PennAITech prioritizes the inclusion of family caregivers in the design, implementation and evaluation of health technology solutions. In this newsletter we include a perspective from family caregivers who are members of our Stakeholder Engagement Core.

Our [PennAITech Video Library](#) consists of educational modules focusing on AD/DRD, aging, AI tools and techniques, ethical implications of research and system design for aging and persons with dementia, and many other domains covered by our PennAITech experts.

Finally, our [webinar series](#) will start again this coming academic year with our first session on September 11, 2025; all recorded sessions are available on our [YouTube channel](#). As always, we invite you to follow our social media platforms, including our [Bluesky](#) presence and reach out with any questions or suggestions.



George Demiris

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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**



**Lauren Massimo
PhD, CRNP**



**Dawn Mechanic-
Hamilton, PhD**

AD/ADRD Focus Pilot Core

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 AI and technology for AD/ADRD predictive analytics, clinical decision support, or the care of adults with AD/ADRD.

Meet the Supporting Core Team

Networking and Mentoring Core

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.



Marylyn D. Ritchie, PhD



Dokyoon Kim, PhD

Technology Identification and Training Core



Li Shen, PhD, FAIMBE



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 AI methods and technologies for healthy aging. The Core will work in close collaboration with the other PennAITech 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/ABRD. It provides a testbed for new technologies designed to monitor aging adults and those with AD/ABRD 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 PennAITech 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

Internal Advisory Board (IAB)



John Holmes, PhD, FACE, FACMI

The Internal Advisory Board (IAB) plays an important role in providing 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 Kinoshian (Division of Geriatrics), and Brian Litt (Director, Penn Center for Health, Devices, and Technology).

INNOVATION FELLOW SPOTLIGHT:

Tianhua Zhai, PhD

Postdoctoral Researcher

Department of Biostatistics, Epidemiology and
Informatics at the University of Pennsylvania



Tell us about your research interests. Describe
some of your research projects.

My research focuses on applying artificial intelligence (AI) and machine learning (ML) to drug discovery, particularly for Alzheimer's disease (AD). By integrating multi-scale data—such as genomic, transcriptomic, proteomic, and clinical datasets—I aim to identify novel therapeutic targets and develop precision treatments. A significant aspect of my work involves creating machine learning models targeting BACE1, a key protein in AD pathology. By utilizing 3D protein-ligand interaction data alongside experimental IC50 results, I enhance the prediction accuracy for binding interactions and assess the therapeutic potential of small molecules. Additionally, I aim to transform complex molecular data into actionable insights, contributing to the identification of effective treatments for AD. My approach emphasizes the use of innovative computational methods to address the challenges of drug discovery and bridge the gap between basic research and therapeutic application. Through these efforts, I aspire to advance AI-driven approaches in biomedical research, paving the way for more effective interventions for Alzheimer's and other diseases.

How do you envision the role of AI and technologies in supporting aging?

AI and advanced technologies are revolutionizing our understanding of the relationship between immune dysregulation and aging. By integrating multi-omics data—including genomics, transcriptomics, proteomics, and metabolomics—AI can identify complex patterns and correlations that drive immune changes over time. These insights are critical for addressing immune decline, a hallmark of aging linked to chronic inflammation, increased infection risk, and age-related diseases such as Alzheimer's and cancer. AI-powered models enable the discovery of biomarkers and pathways associated with immune aging, helping to pinpoint potential therapeutic targets. For instance, by analyzing multi-omics datasets from diverse populations, AI can uncover how genetic, environmental, and lifestyle factors contribute to immune dysregulation. This can inform personalized interventions to mitigate immune decline and promote healthier aging. Additionally, AI can provide a deeper understanding of immune system dynamics by identifying key molecular and cellular changes, fostering the development of therapies to delay or reverse immune dysfunction. By transforming complex data into actionable insights, AI has the potential to bridge knowledge gaps and drive innovations that enhance the quality of life and healthspan in aging populations.

What do you see as some of the greater opportunities and challenges for the future?

AI offers remarkable opportunities for the future, particularly in its ability to process and analyze high-dimensional data beyond human capacity. This capability enables AI to uncover complex patterns and insights from vast datasets, driving progress in fields such as personalized medicine and drug discovery. For example, AI can design more effective drugs by simultaneously considering hundreds of factors, including molecular interactions and patient variability, achieving levels of precision and efficiency that human experts cannot replicate. However, AI also presents significant challenges, especially in fairness and accessibility. Wealthier individuals, organizations, and nations often have access to superior AI systems built with extensive training data, while underserved communities primarily contribute data without equal access to AI-driven benefits. This imbalance risks widening existing disparities, as richer groups gain more advantages from AI innovations. To address these challenges, we must focus on creating inclusive datasets, promoting transparent AI development, and implementing equitable policies to ensure that AI benefits are shared across all socioeconomic groups. By balancing these opportunities and challenges, AI has the potential to become a transformative tool for solving global problems while fostering a more just and equitable future.

INNOVATION FELLOW SPOTLIGHT:

Yoonjae Lee, DNP, APRN, FNP-BC

Current PhD student

School of Nursing



Tell us about your research interests. Describe some of your research projects.

My research focuses on preventing opioid-related harms among individuals who use opioids for acute or chronic pain. Through the lens of a biopsychosocial framework, I am exploring the multifactorial and complex influences that contribute to opioid-related harms. Methodologically, I am particularly interested in data science, especially natural language processing (NLP) and machine learning (ML). To deepen my expertise, I recently completed a Biomedical Informatics Certificate through the Perelman School of Medicine. Aligned with these interests, one of my ongoing projects involves developing an ML model to predict opioid use disorder (OUD) among chronic pain patients receiving long-term opioid therapy. I also conducted a systematic review and meta-analysis to examine patient-level predictors of new persistent opioid use among opioid-naïve surgical patients. This work has evolved into my dissertation, which applies natural language processing (NLP) techniques to analyze clinical free-text notes from electronic health records in order to identify factors associated with continued opioid use and opioid-related harms following arthroplasty procedures. Ultimately, my goal is to develop explainable, scalable tools grounded in data science to support clinicians in identifying patients at risk and tailoring interventions that reduce opioid-related harms.

How do you envision the role of AI and technologies in supporting aging?

I believe AI and technologies can play a critical role in supporting aging populations by enabling more personalized, proactive, and data-driven care. When thoughtfully implemented, AI has the potential to transform how we assess, treat, and care for older adults. These innovations can empower patients, strengthen communication between providers and patients, and ultimately improve health outcomes across the aging population. For example, as the population ages, the number of older adults undergoing surgical procedures (especially total joint arthroplasty) is expected to rise significantly. This trend presents both challenges and opportunities for improving postoperative outcomes, especially in pain management and opioid use. AI tools can help address these challenges by identifying individuals at high risk for persistent opioid use and supporting recovery through technologies such as chatbots and mobile health applications, which facilitate symptom monitoring and self-care after discharge.

What do you see as some of the greater opportunities and challenges for the future?

I view the future of AI with optimism. From the perspective of a researcher and clinician, AI offers many promising opportunities, such as developing predictive models for specific conditions and implementing them in clinical practice as decision support tools. These models can help identify high-risk patients earlier and enable timely interventions, ultimately improving outcomes. AI can also enhance clinical efficiency by streamlining workflows and allowing clinicians to dedicate more time to direct patient care. That said, there are important challenges to address, particularly from an ethical standpoint. Data imbalances can result in biased models that may reinforce existing health disparities. We should remain vigilant in identifying and mitigating such biases. Also, protecting patient privacy and ensuring data security are critical concerns. As we are still in the (relatively) early stages of integrating AI into healthcare, this is a pivotal moment to establish strong ethical frameworks, regulations, and policies.



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for Healthy Aging

CLICK HERE TO VIEW OUR
2025-2026 YR4 PILOT AWARDEES
LOOK BOOK



Min Ji Kwak

Detection of Adverse Drug
Event Using NLP Among Older
Adults with Heart Failure

University of Texas Health
Science Center at Houston



Katherine Kim

A Novel Digital Twin for
Chronic Care Coordination
and Healthy Aging

Health Tequity LLC



Nili Solomonov

Scalable subtyping for
personalized assessment of
late-life social disconnection

Weill Cornell Medicine



Nancy Hodgson

Using AI to predict depression
& burden AD/ABRD
caregiving conversations

University of Pennsylvania



Bin Huang

AI-Driven Chatbot to Navigate
Cognitive Care Plan for
Persons with AD/ABRD

BrainCheck



Kyra O'Brien

WATCH (Warning Assessment
and Alerting Tool for
Cognitive Health)

University of Pennsylvania



Emily Moin

Determinants of access to
and outcomes following
specialized palliative care for
patients with ADRD

University of Pennsylvania



Rory Boyle

Understanding aging and
ABRD disparities using a
representative epigenetic clock

University of Pennsylvania



Vijaya Kolachalama

AI-based tool for mixed
dementias

Boston University



Mehmet Kurt

An explainable deep learning
framework for brain age
prediction in AD

University of Washington



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Artificial Intelligence and
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for Healthy Aging

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2024-2025 PILOT AWARDEES
LOOK BOOK



Xina Quan

Improved algorithms for
wearable, passive,
noninvasive BP monitoring
for seniors

PyrAmes



Soheyla Amirian

AI-powered Web Application
to Analyze Knee Joint Space
for Aging Population

Pace University



Rui Zhang

Task-Oriented Multimodal
Conversational AI for
Assisting Seniors with Daily
Tasks

Penn State University



Chun Lim

Mobile technology as a
cognitive biomarker of
Alzheimer's disease

Beth Israel Deaconess
Medical Center (BIDMC)



Mohammad H. Mahoor

Building Deep Digital Twins
for Prediction of AD/ADR/MCI
in Older Adults

DreamFace Technologies, LLC



Ab Brody

Aliviado Dementia Care
Machine Learning Algorithm
Development for Caregiving

New York University



Nicholas Kalaitzandonakes

AI/ML Analyses of Mobility
Changes Among Elderly Using
Continuous Gait Data

Foresite Healthcare



Daniel Press

Developing a Home Cognitive
Vital Sign to Detect Cognitive
Changes AD

Beth Israel Deaconess
Medical Center (BIDMC)



Trent M. Guess

Motor function assessment for
mild cognitive impairment,
frailty, and fall risk

University of Missouri



Hualou Liang

Detecting Cognitive
Impairment using Large
Language Models from Speech

Drexel University



Jindong Tan

MUSICARE-VR: Music
Intervention with Virtual
Reality for Alzheimer's Care

University of Tennessee,
Knoxville

PILOT IN THE SPOTLIGHT:

Mobile technology as a cognitive biomarker of Alzheimer's disease



PI: Chun Lim, MD PhD

Assistant Professor of Neurology
Harvard Medical School Medical
Director, Division of Cognitive
Neurology Beth Israel Deaconess
Medical Center



John Torous, MD

Director, Digital Psychiatry
Division Beth Israel
Deaconess Medical Center
Instructor in Psychiatry
Harvard Medical School

TELL US ABOUT YOUR PROJECT AND WHAT YOU HAVE DONE THIS YEAR.

Currently, diagnoses of Alzheimer's disease are reliant on pen and paper clinical cognitive assessments, but due to training and time constraints, only about half of patients receive a clinical diagnosis. We propose to modernize the clinical diagnosis of Alzheimer's disease by taking advantage of smartphones to collect multiple streams of behavioral information including active data such as reaction/response time to cognitive tasks as well as passive data such as mobility and sleep patterns. This year, we have started a collaboration with Dr. John Torous in the BIDMC Digital Psychiatry Division to utilize his mobile app, mindLAMP, to collect data. Six cognitive games to collect active data have been developed, and seven passive data streams have been identified. Both Alzheimer's patients seen at the BIDMC Cognitive Neurology Unit and cognitively normal participants have been enrolled in a six-month observational study. We aim to identify the ecological (both active and passive) data that best identifies cognitive impairment caused by Alzheimer's disease and characterize how this ecological data changes over time.

WHAT ARE THE LONG TERM GOALS FOR YOUR RESEARCH?

Our long-term goals are to develop a validated machine learning model to automatically detect cognitive impairments and to incorporate this into an AI-grounded smartphone application which can identify and track patients with very early-stage Alzheimer's disease while at home. This app will be used to assess different stages of cognitive impairment and to detect clinical meaningful changes such as the transition from independence to supervision. Such an app will offer a range of uses as a diagnostic tool, for home monitoring, and to measure efficacy of intervention trials, lessening the burden on clinicians of frequent neuropsychological testing. By capturing multiple data streams and domains of mental functioning, such as behavior, cognitive performance, and daily functioning, with all information enhanced by Machine Learning, we aim to identify novel, more reliable assessments and biomarkers of Alzheimer's disease.

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

AI has the potential to play several roles in understanding and supporting the aging process. For those who are feeling lonely, all too common in the elderly population, AI-integrated technology can provide a sense of companionship. A person's safety can be assessed and assured with AI, allowing people to live on their own longer. AI can also consistently monitor people's well-being, warning of any potentially concerning symptoms or behaviors. Our technology aims to create a tool with which people may screen for, detect, and monitor cognitive issues. By integrating AI with current clinical tools for detecting cognitive impairment, the information gathered from cognitive assessments can be enhanced, novel data streams can be accessed, and results concerning for Alzheimer's disease can be automatically identified and followed. Not only would this allow for easier and faster diagnoses of neurocognitive disorders (and faster treatment) for clinicians, but patients and their caregivers would have more support in assessing and managing cognitive decline.



Chun Lim and Meaghan McKenna present the study poster and demonstrate the mindLAMP app at the a2 National Symposium in Boston, MA.

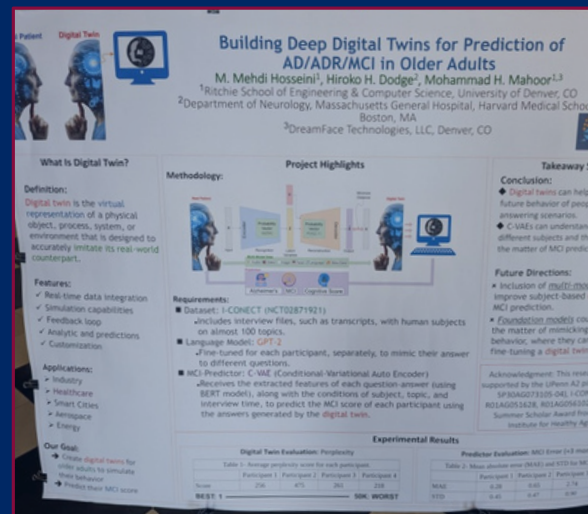
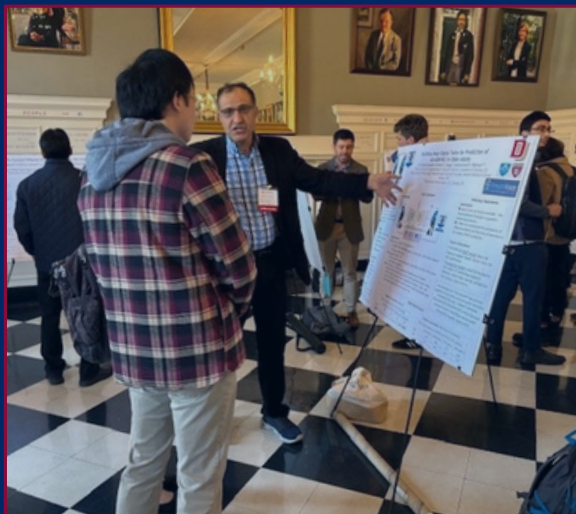
PILOT IN THE SPOTLIGHT:



Building Deep Digital Twins for Prediction of AD/ADR/MCI in Older Adults

TELL US ABOUT YOUR PROJECT AND WHAT YOU HAVE DONE THIS YEAR.

Our project centers on developing Deep Digital Twins (DDTs)—advanced AI models designed to simulate and predict the cognitive health trajectory of older adults. The primary goal is to use these models for early prediction of Alzheimer’s disease (AD), AD-related dementias (ADRD), and mild cognitive impairment (MCI), using behavioral and conversational data instead of costly clinical or neuroimaging inputs. This year, our team at DreamFace Technologies and the University of Denver has initiated the design and implementation of a DDT framework using Conditional Variational Autoencoders (CVAEs)—a type of deep generative model that can learn from complex, multi-modal data sources such as speech, facial expressions, language, demographics, and clinical metadata. We are leveraging datasets like I-CONNECT, Pitt DementiaBank, and NACC to train and validate our models. These datasets provide a rich combination of conversational and clinical data, particularly from socially isolated older adults—an at-risk population for cognitive decline. Our trained models successfully created deep learning-based digital twins that accurately predicted MCI scores, demonstrating the strong potential of this technology for studying cognitive decline in older adults. By leveraging longitudinal data from neuropsychological assessments, these AI models generate personalized simulations that capture individual patterns of cognitive change over time, enabling the forecasting of future cognitive status and responses to clinical evaluations.



Dr. Mohammad Mahoor presented the results of this research at the a2 National Symposium in Boston, MA.



**PI: Mohammad H.
Mahoor, PhD**

Founder of DreamFace
Technologies & Professor
of Computer Science at
the University of Denver



Hiroko H. Dodge, PhD
Professor of Neurology,
Harvard Medical School



Mehdi Hossein
Graduate Research
Assistant,
University of Denver



Muath Alsuhaibani
Graduate Research
Assistant,
University of Denver

WHAT ARE THE LONG TERM GOALS FOR YOUR RESEARCH?

Our long-term vision is to create a scalable, accessible, and clinically meaningful digital health tool that can detect early cognitive impairment using non-invasive, conversational AI. We aim to shift the paradigm from expensive, reactive diagnostics to low-cost, proactive monitoring—especially for underserved populations. Eventually, we foresee these DDTs being deployed in multiple formats: as standalone AI applications for clinicians and researchers, integrated into virtual care platforms, or even embedded in socially assistive robots such as our existing Ryan CompanionBot.

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

Artificial Intelligence—and in particular, the use of digital twins—has the potential to revolutionize how we support aging populations. Digital twins are personalized AI models that simulate an individual's cognitive and health trajectory based on their data. These models can detect subtle changes over time, forecast future cognitive decline, and help clinicians intervene earlier with tailored strategies. Combined with conversational AI and socially assistive technologies, digital twins offer a powerful approach to both monitor and support older adults in a non-invasive and continuous manner. As these tools become more accessible, they can promote aging in place, reduce the burden on caregivers, and improve overall quality of life for older adults by providing proactive, personalized, and data-driven care.

PILOT IN THE SPOTLIGHT:



NYU

RORY MEYERS
COLLEGE OF NURSING

Aliviado Dementia Care Machine Learning Algorithm Development for Caregiving



Ab Brody, PhD, RN, FAAN

Mathy Mezey Professor of Geriatric Nursing
Professor of Nursing and Medicine
NYU Rory Meyers College of Nursing
Associate Director, HIGN
Founder, Aliviado Health



Shih Yin Lin, PhD

Senior Research Scientist
NYU Rory Meyers
College of Nursing



Kimberly Hom, MPA

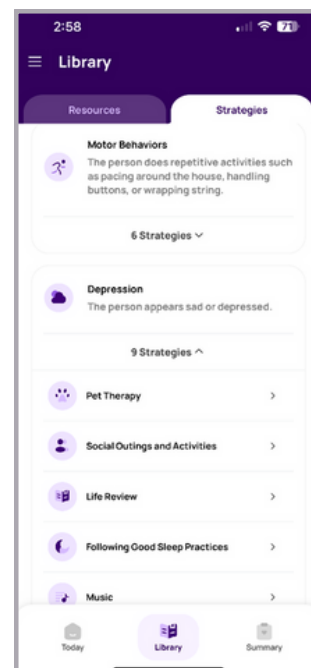
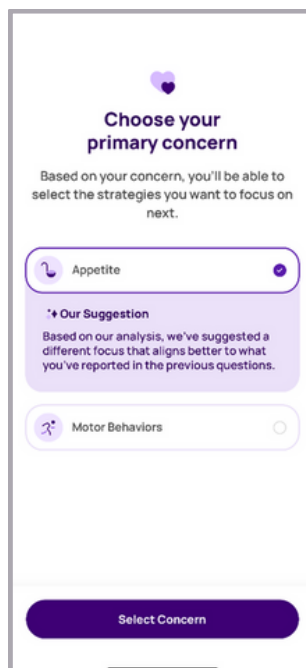
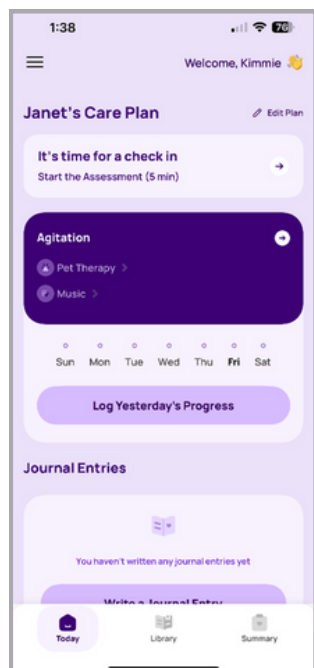
Program Coordinator
NYU Rory Meyers
College of Nursing

TELL US ABOUT YOUR PROJECT AND WHAT YOU HAVE DONE THIS YEAR.

Our team has co-designed a mHealth app called Aliviado Caregiving with a Caregiving Advisory Board comprised of experienced caregivers of persons living with dementia. The app aims to help caregivers prioritize and self-manage behavioral and psychological symptoms of dementia in their care recipients. Caregivers answer a series of evidence-based assessments in the app and are able to create personalized care plans with non-pharmacologic strategies to manage dementia symptoms in the person they are caring for. To assist caregivers with which symptom to prioritize, we utilized the National Alzheimer's Coordinating Center's Uniform Data set to develop a precision heuristic machine learning algorithm within the app to provide clinical decision support for caregivers.

We are currently in Phase 1 of app testing and recruiting research participants to assess the app's overall usability, acceptability of implementation, and caregivers' agreement with the algorithm's recommended priority symptom. To date, we have enrolled 21 study participants for this feasibility study. We will use the gathered data to further refine the algorithm and develop new features for the app.

A LOOK INSIDE THE MHEALTH APP CALLED ALIVIADO CAREGIVING



WHAT ARE THE LONG TERM GOALS FOR YOUR RESEARCH?

The long-term goals for this research are to better understand symptom trajectories in community-dwelling persons living with dementia (PLWD), and precision tailor evidence-based non-pharmacologic strategies to the individual and their caregiver to better support both the PLWD and caregiver and improve their quality of life. The use of mobile technology is now widespread and utilizing it to improve symptoms, thus reducing caregiver stress and burnout would be beneficial to both caregivers and the persons they are caring for. Our app will increase the access to high-quality low-cost dementia symptom self-management for everyone. The team's next steps are to begin exploring the use of generative AI and a caregiving conversational agent embedded within the app to address caregiving questions, as well as examine current accuracy of a variety of generative AI models when asked questions about dementia behavioral and psychological symptom management. We also seek to provide multilingual support and support for multiple caregivers caring for the same individual.

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

We envision AI and other technologies playing a crucial role in supporting aging by making evidence-based, scalable, low-cost, and accessible mHealth approaches to address the needs of older adults and their caregivers in the community. Current initiatives have already played a transformative role in health monitoring, disease prevention and remote diagnostics. New technologies aimed at enhancing the quality of life and independence for aging populations can address issues such as mobility, social isolation and medication management. The use of AI can help create more inclusive and age-friendly environments by developing home automations with smart devices, communication tools and fall detection systems. As we integrate these technologies, we must prioritize privacy and data security, in addition to addressing accessibility and equity so technology does not widen the digital divide among older adults. Furthermore, human oversight is essential. AI should augment, not replace, human care.



 Penn Nursing
UNIVERSITY OF PENNSYLVANIA

Collaborative Design + Co-creation for Health Equity

Summer Innovation Institute

.5 C.U.

June 23rd–27th 2025

Presented in partnership with:
Penn Artificial Intelligence and Technology Collaboratory for Healthy Aging
and Johnson & Johnson Nurse Innovation Fellowship Program.

Penn Nursing held its third Summer Innovation Institute, focusing on collaborative design and co-creation for health equity. The week-long event (June 23-27, 2025) was organized jointly by the School of Nursing, Penn Artificial Intelligence and Technology Collaboratory for Healthy Aging (PennAITech), and Johnson & Johnson Nurse Innovation Fellowship Program.



The program brought together experts from the School of Nursing, the Weitzman School of Design, the Perelman School of Medicine, the Wharton School, Penn Carey Law, the Penn School of Engineering and Applied Sciences and Penn Libraries, along with many external experts, to help translate their knowledge into action and solutions for attendees leading on health care challenges.

During the morning programming, we had several didactic sessions and presentations focusing on concepts of design thinking and social justice as well as inclusive and participatory design. In the afternoon, our PennAITech awardees participated in sessions focused specifically on entrepreneurship for aging and technology, the translation and commercialization of innovation in aging and ways to engage stakeholders in all phases of design, implementation and evaluation. Special thanks to our external guests: Drs. Peter Abadir, Walter Boot, Mai Lee Chang, Deepak Ganesan, Sheng-Hung Lee and Rose Li; our Technology Core Co-Leader: Dr. Li Shen and innovation fellows: Drs. Bojian Hou, Shu Yang and Tianhua Zhai.

Our family caregivers of older adults with dementia and/or other serious illness returned for a second year and highlighted ways to capture the family needs and preferences in the design of new technologies for aging. These stakeholders met separately with our awardees to provide feedback about ways to engage end users in the design and evaluation of systems.





More information about the event can be found here:
<https://www.nursing.upenn.edu/live/news/summer-innovation-institute-2025>

[Link to full program for the event found HERE!](#)

“Family Caregivers and the AITCs: Caregiver Stakeholders’ Perspectives”

By AITC Caregiver Stakeholders Dee Fowlkes, Susan Jackewicz, Lily Liu and Marie Maloney

One of the most famous American movies is “It’s a Wonderful Life.” This 1946 film starred beloved actor James Stewart as the character George Bailey, who has a guardian angel named Clarence sent from Heaven to show George what life and his community would have been like if he had never existed. George had spent his entire life helping others in his hometown of Bedford Falls, New York, so the alternate timeline was a bleak one without him.

We can use the premise of this classic film, “what if X had not happened,” to reflect on our own lives. This was the subject of a lively discussion we Family Caregiver Stakeholders recently had about how much richer our lives have been since we were invited to participate on the Stakeholder Councils of the a2 Collective. This Collective represents the Artificial Intelligence and Technologies Collaboratories (AITC) for Aging Research Program. In 2023, we received the generous invitation to have a seat at the table to share our years of lived experience as family caregivers with the three Collaboratories (Johns Hopkins University – JH AITC, University of Massachusetts Amherst – MassAITC, and University of Pennsylvania – PennAITech).

To date, by serving on our respective Stakeholder Councils, we Family Caregiver Stakeholders have had an opportunity to speak on the Caregiver Panel at an Annual National Symposium and have received repeat invitations to be Presenters at the PennAITech Summer Innovation Institute. And we have had access to monthly virtual presentations about the innovative projects of different rounds of Awardees supported by the a2 Collective. Some of the AITCs also have linked us with individual product developers and we have shared our direct feedback. In summary, we have had a front-row seat in being introduced to cutting-edge AgeTech projects that seek to improve care and health outcomes for older adults, including persons with Alzheimer’s Disease and related dementias (AD/ADRD) through the application of artificial intelligence (AI) and emerging technologies.

So, what did we Family Caregiver Stakeholders hope to bring to the AITC for Aging Research Program?

1) We have leveraged storytelling to make key points as we share the unique experiences we have had during years, and often decades, of providing care to our loved one(s). We have been and/or continue to be members of that unpaid, too often invisible labor force that is the backbone of the current American long-term-care “system”. We have shared stories of the obstacles and pain points we’ve faced in navigating the health-care “system”. Here we purposefully put “system” in quotes because the definition of a system is “a set of things working together as parts of a mechanism or an interconnecting network.” Our experiences providing hands-on care 24/7 have revealed to us too many

instances when this “system” is fragmented, broken, and/or inadequate.

2) We have respectfully shared reminders about the importance of involving family caregivers as early as possible in the design process – as far upstream as possible – so that we can help identify any possible issues before significant time and resources are invested in product development. From our years of lived experience with daily (often hourly!) care routines, we can help the AgeTech designers to better understand actual usage conditions when our loved one(s) age in the home and in the community as well as help researchers move beyond assumptions in a laboratory setting.

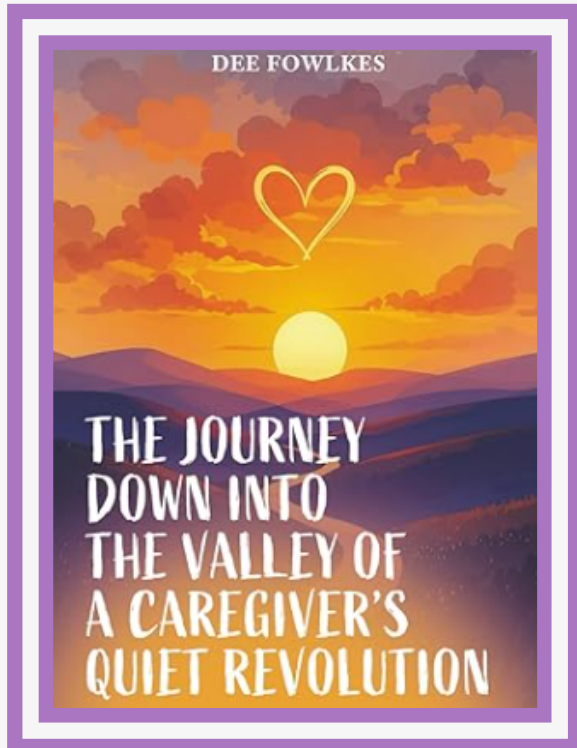
Since 2017, the NIH/NIA National Research Summits on Care, Services, and Supports for Persons Living with Dementia and Their Care Partners have highlighted patient/family caregiving dyads in research. Our participation in the a2 Collective contributes to closing knowledge gaps of patient/caregiver interaction with personal insights about real-world research applications and also reveals opportunities for future research that perhaps might have been overlooked.

In our presentations, we Family Caregiver Stakeholders start our remarks by saying: “When you’ve met one caregiver, you’ve met one caregiver.” The informal care being provided in home settings across this nation vary significantly in duration, scope and depth or intensity. There is great variety in the complexity of daily care routines, which often involve carrying out a myriad of tasks far beyond assistance with ADLs and IADLs as well as the mastering of a set of skills for which we are often ill-prepared. The tacit knowledge that family caregivers accumulate are a treasure trove of qualitative data to be mined. And, as care moves more into the home setting, research through the a2 Collective that engages patients and families could produce new care and health results previously deemed impossible and thus help to move the needle on public attitudes towards the use of AI within healthcare.

There is still much that we four Family Caregiver Stakeholders aspire to contribute. We have already gotten glimpses of the power and potential of AI in clinical settings. We caregivers will remain hopeful that future collaborative AI initiatives champion care that remains as patient-centric as possible and that we can trust a healthcare ecosystem is using AI responsibly and protecting data privacy.

In this turbulent time of great uncertainty about the future of scientific research in America, we Family Caregiver Stakeholders wish to express our gratitude for having been gifted with this rare opportunity to participate in the a2 Collective. The brilliant and hardworking individuals we have met through the AITCs give us great hope about the support being developed for us family caregivers and the recipients of our care as well as for our own future as aging adults.

Checkout Stakeholder Dee Fowlkes' New Book!



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Dee Fowlkes is a stakeholder of the Johns Hopkins AITC and has been a family caregiver for over 25 years to her parents and grandparents. Her experience includes being a 24-hour caregiver as well as attended 4 years of intense education about caregiving, dementia, and Alzheimer's Disease. She understands how the different stages affect loved ones and family caregivers at different stages. Dee Fowlkes is an advocate, she spoke before several Maryland hearings concerning the mandatory education of healthcare professionals. Dee is a Certified Johns Hopkins Medical Lay Health Educator and created her own TIZ I Health & Wellness Program for ages 50 and up.



Connect with Dee on [LinkedIn](#):

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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* (**PennAITech**) is a program that fosters innovation to support aging. **We are looking for family caregivers, 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

NEWS FROM THE FIELD

WHAT'S HAPPENING IN AI?

AI robots easing eldercare in Japan

Japan is deploying prototype humanoid robots (e.g. AIREC) to assist elderly patients with tasks like repositioning to prevent bedsores, addressing a severe caregiver shortage in an aging society. While promising, safety and cost concerns remain top of mind. Read more here:

<https://www.reuters.com/technology/artificial-intelligence/ai-robots-may-hold-key-nursing-japans-ageing-population-2025-02-28/health-disparities>

Philips report: trust gaps slowing AI healthcare adoption

The Future Health Index 2025 survey of nearly 2,000 clinicians and patients across 16 countries finds AI could significantly improve care delivery but widespread trust gaps, especially among patients over the age of 45, and clinicians uncertain about liability and bias, pose major barriers to scaling adoption.

<https://www.philips.com/about/news/archive/standard/news/press/2025/philips-future-health-index-2025-ai-poised-to-transform-global-healthcare-urging-leaders-to-act-now.html>

AI identifies anti-aging drug candidates

Using AI, researchers at Scripps and biotech startup Gero discovered compounds that extended lifespan in *C. elegans* microscopic worms; they examined hundreds of polypharmacological drug hits, over 70% of which showed significant lifespan extension. A move beyond one-drug-one-target models may revolutionize aging therapeutics.

<https://www.scripps.edu/news-and-events/press-room/2025/20250529-petrascheck-ai-anti-aging.html>

FaceAge AI: biological aging from selfies forecasts cancer survival

The FaceAge tool, developed by Mass General Brigham, uses facial imaging to estimate biological age. Tested on cancer patients, the model improved six-month survival prediction accuracy (from ~61% to ~80%) when combined with clinician assessment. Patients appearing biologically older tended to have poorer outcomes.

<https://www.ft.com/content/3ac60aaf-3b55-4f1c-858c-7b42b4cbd914>

SELECTED PUBLICATIONS

WORK BY OUR TEAM

01.

"I'm his brain": A qualitative study of care partners supporting the inner strength of persons living with mild cognitive impairment.

Morgan B, Brody AA, Chodosh J, **Karlawish J**, Ravitch S, **Massimo L**, Hodgson N. *Alzheimers Dement*. 2025 May;21(5):e70286. doi: 10.1002/alz.70286. PMID: 40390201

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Neuroimaging endophenotypes reveal underlying mechanisms and genetic factors contributing to progression and development of four brain disorders.

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Kumar R, Romano JD, **Ritchie MD**. *BioData Min*. 2025 May 27;18(1):37. doi: 10.1186/s13040-025-00452-x. PMID: 40426270

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Smartphone-Based Analysis for Early Detection of Aging Impact on Gait and Stair Negotiation: A Cross-Sectional Study.

Hayek R, **Brown RT**, Gutman I, Baranes G, Springer S. *Sensors (Basel)*. 2025 Apr 5;25(7):2310. doi: 10.3390/s25072310. PMID: 40218822

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Sanderson-Cimino M, Gross AL, Gaynor LS, Paolillo EW, Saloner R, Albert MS, Apostolova FG, Boersema B, Boxer AL, Boeve BF, Casaletto KB, Hallgarth SR, Diaz VE, Clark LR, Maillard P, Eloyan A, Farias ST, Gonzales MM, Hammers DB, Joie R, Cobigo Y, Wolf A, Hampstead BM, **Mechanic-Hamilton D**, Miller BL, Rabinovici GD, Ringman JM, Rosen HJ, Ryman SG, Prestopnik JL, Salmon DP, Smith GE, DeCarli C, Rajan KB, Jin LW, Hinman J, Johnson DK, Harvey D, Fornage M, Kramer JH, Staffaroni AM. *medRxiv [Preprint]*. 2025 Apr 3:2025.03.31.25324964. doi: 10.1101/2025.03.31.25324964. PMID: 40236433

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Berridge C, Turner NR, Lober WB, **Demiris G**, Kaye J. *J Alzheimers Dis*. 2025 Jun;105(3):825-836. doi: 10.1177/13872877251332659. Epub 2025 May 1. PMID: 40313054

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Luth EA, Brickner C, Rakotoarivelo H, Gao O, **Bowles KH**. Res Gerontol Nurs. 2025 Jun 10:1-10. doi: 10.3928/19404921-20250522-01. Online ahead of print. PMID: 40488518

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Cho E, Cho H, **Demiris G**, Harrison S, Ji X, Yuh A, Sokolsky O, Lee I. Sage Open Aging. 2025 Apr 29;11:30495334251325607. doi: 10.1177/30495334251325607. eCollection 2025 Jan-Dec. PMID: 40611868

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Patient-level barriers, related facilitators, and proposed strategies for timely home health care and outpatient appointments for sepsis survivors: Perspectives from healthcare system and home health care informants. Sang E, Hirschman KB, Stawnychy MA, Bin You S, Pitcher KS, O'Connor M, Oh S, Song J, Garren P, Newman BJ, **Bowles KH**. Patient Educ Couns. 2025 Sep;138:109207. doi: 10.1016/j.pec.2025.109207. Epub 2025 Jun 2. PMID: 40472764

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A review of public comments submitted to the Centers for Medicare and Medicaid Services in response to the 2022 National Coverage Decision on treatment for Alzheimer's disease. Greenberg KS, Lynch HF, Nwakama C, Frumovitz J, Setru S, Johnson AM, Shah SM, Schadt L, McCoy MS, Hoffman AK, **Largent EA**. J Law Biosci. 2025 Apr 4;12(1):lsaf004. doi: 10.1093/jlb/lsaf004. eCollection 2025 Jan-Jun. PMID: 40190585

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Neighborhood deprivation moderates prognosis in behavioral-variant frontotemporal degeneration. Boyle R, Dehghani N, Emrani S, Wadhwani AR, Matyi M, Cousins KAQ, Rhodes E, Nelson B, Stites SD, Xie SX, Dratch L, Van Deerlin VM, Snyder A, Irwin D, McMillan CT, **Massimo L**. medRxiv [Preprint]. 2025 May 13;2025.05.12.25327099. doi: 10.1101/2025.05.12.25327099. PMID: 40463548

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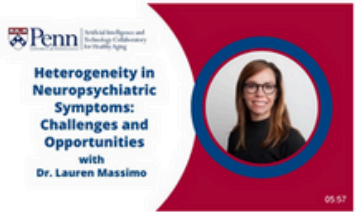














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We are excited to feature our PennAITech Video Library consisting of educational videos covering a broad range of topics from an introduction to Alzheimer's Disease and Related Dementias to Basics of Artificial Intelligence, Machine Learning and Natural Language Processing. The library addresses clinical, technical and ethical implications of designing and deploying AI and other technologies for aging and persons with dementia and their families. The topics include:

PennAITech Video Library

 <p>Introduction to PennAITech with Dr. George Demiris</p> <p>04:53</p>	 <p>AD / ADRD: Definitions with Dr. Jason Karlawish</p> <p>04:31</p>	 <p>Heterogeneity in Neuropsychiatric Symptoms: Challenges and Opportunities with Dr. Lauren Massimo</p> <p>05:57</p>
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 <p>Automated Machine Learning and Best Practices in Data Science with Dr. Ryan Urbanowicz</p> <p>05:47</p>	 <p>Interprofessional Robotics Research with Dr. Pamela Z. Cacchione</p> <p>13:45</p>	 <p>Ethical Considerations in Human Subjects Research with Dr. Emily Largent</p> <p>06:39</p>
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 <p>Big Data and ADRD with Dr. Marylyn Ritchie</p> <p>06:18</p>	 <p>Digital Technology Use in Cognitive Assessment: Is it feasible and does it add value? with Dr. Dawn Mechanic-Hamilton</p> <p>05:57</p>	 <p>Passive Sensing and Smart Homes for Aging with Dr. George Demiris</p> <p>10:03</p>
 <p>Treating Sepsis with Dr. Kathy Bowles</p> <p>15:17</p>	<div>  </div>	

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