

BOSTON UNIVERSITY

Center for Brain Recovery

ANNUAL REPORT | 2026

A Continuous Cycle of Care:
Prevent, Detect, Diagnose,
Treat, and Predict



BOSTON
UNIVERSITY

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On the front cover: PhD Candidate, Erin Carpenter, and undergraduate research assistant, Helen Blans, demonstrate the testing process with fNIRS-EEG equipment.

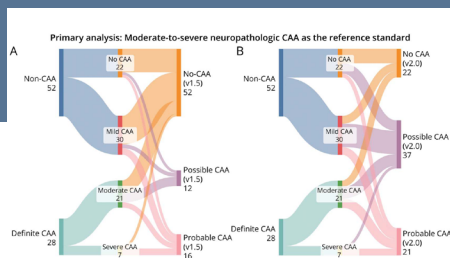
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Letter From the Director

“Now in our fourth year, CBR has matured from a promising interdisciplinary experiment into a nationally visible hub for translational brain health research. We are proud to be measurably outperforming world benchmarks in scholarly impact, expanding our funding base, and building the infrastructure that will carry us into the future.”

— Dr. Swathi Kiran

Over the past year we organized our research into a framework that emphasizes a single continuous cycle of care: Prevention, Detection, Diagnosis, Treatment, and Prediction. This framework unites clinicians, neuroscientists, engineers, and data scientists from Sargent College, the College of Engineering, Arts & Sciences, the Chobanian & Avedisian School of Medicine, the School of Public Health, and Boston Medical Center around a shared translational mission. This organizing logic has informed our grant strategy, our seminar series, and the nearly 320 scholarly outputs our faculty produced between January 2025 and June 2026. Our Field-Weighted Citation Impact of 1.35 this period is 30% over the world average, with 54 papers ranking in the top 10% most cited worldwide and nearly half of our output appearing in top-decile journals. These metrics reflect work that is shaping how the field thinks about brain recovery.

Our research work continued to be innovative on all fronts. Our wearable, high-density fNIRS platform is moving brain measurement out of the laboratory and into everyday life, now extended to stroke, dementia, and real-world activities of daily living. Our diagnostic research produced field-leading advances in multimodal AI for Alzheimer’s disease and related dementias, and our treatment portfolio spans behavioral therapy, non-invasive brain stimulation, and rehabilitation robotics. Perhaps most exciting, a recent randomized controlled trial using computational “digital twins” to predict bilingual aphasia treatment outcomes which was published in *npj Digital Medicine* stands among the first RCT-level validations of model-based digital twin in neurorehabilitation, a landmark for the field.

This scientific momentum was complemented by active research grant seeking. CBR faculty led approximately \$32.9 million in grant proposals this year and helped catalyze another \$23.3 million, for \$56.2 million in total proposal activity, with \$8.7 million in awards just this year alone.

We formalized our first international partnership with the Ewha Brain Institute in Seoul, hosted a sold-out third annual Neuroscience of the Everyday World conference, brought our research to the San Francisco Bay Area and Boston Tech Week, and co-sponsored our inaugural MedAI Hackathon, drawing more than 230 student participants from across BU’s campuses. We are also proud of how this growth has translated into people. Our faculty were recognized with honors ranging from AAAS fellowship to national mentorship awards, and Dr. Antreas Charidimou stepped into a new role as Associate Medical Director. Our student internship program, now formally structured with a dedicated curriculum, welcomed 29 interns this year, several of whom secured independent UROP funding and earned national scholarships and awards. And our research participant registry which now includes 1,046 richly phenotyped individuals recruited from across the country gives us a national infrastructure for recruitment for various behavioral experiments and clinical trials.

As we look ahead, our priorities are still to convert our growing pipeline of pending awards into funded programs, deepen mentorship of junior faculty, and translate our research infrastructure into industry partnerships that extend our impact beyond the University. We enter this next year from a position of scientifically distinctive and increasingly field-leading interdisciplinary brain research. We look forward to sharing the outputs of this continued momentum in the coming years.



Dr. Swathi Kiran

Swathi Kiran, PhD
Founding Director

Letters From the Assistant Directors

Building an Integrated Community for Brain Recovery

At the Center for Brain Recovery (CBR), our work is shaped by the community that makes all the research projects possible. CBR brings together scientists, clinicians, trainees, and research staff with different areas of expertise around a shared commitment to understanding brain recovery and improving the lives of individuals affected by neurological conditions.

Across the Center, research is increasingly informed by the experiences and needs of the populations we study. Close connections between our research and clinical communities also help ensure that questions arising in clinical practice inform scientific priorities, while emerging discoveries are considered in terms of their potential relevance to patient care. Our PCORI-supported work, for example, examines the broader impact of aphasia on individuals living with aphasia and their caregivers, helping to ensure that research priorities reflect what matters to patients and their families. At the same time, initiatives such as the development of new approaches to treatment, including remotely supervised transcranial direct stimulation (tDCS) combined with app-based language therapy, aim to make rehabilitation more accessible beyond the traditional clinic setting. Complementary efforts are focused on improving detection and prediction using machine learning methods and computational modeling to predict language recovery, automated speech and language analysis for diagnostic applications, and traditional fMRI-based and more naturalistic fNIRS-based paradigms to identify biomarkers of brain function and recovery.

Looking ahead, CBR is also beginning to build coordinated clinical research portfolios in the fields of vascular cognitive impairment and dementia (VCID) and cerebral amyloid angiopathy (CAA), bringing together expertise in cerebrovascular disease, cognition, neuroimaging, biomarkers, and clinical care. By developing these areas across complementary and interdisciplinary research areas, we are excited to position CBR as a platform for advancing clinical research and, over time, contributing to the development of evidence-based approaches and guidance for the diagnosis, management, and study of these increasingly important conditions.

A key part of CBR's role is to provide the infrastructure and opportunities that allow collaboration to develop across laboratories and disciplines. Center-wide recruitment infrastructure, shared expertise and resources, seminars, and faculty meetings support ongoing research while also creating opportunities for new collaborations to emerge. Training the next generation of researchers is also central to this community. Through the CBR Internship Program and the growing community of graduate students and postdoctoral fellows affiliated with the Center, trainees gain exposure to interdisciplinary brain recovery research, and contribute directly to ongoing studies. Together, these activities strengthen both the research taking place at CBR today and the community that will carry this work forward.

As we look ahead, we hope to continue strengthening the connections among scientific discovery, clinical relevance, collaboration, and training. Our goal is to ensure that CBR remains a community where people and ideas come together to advance brain recovery, while building areas of scientific and clinical leadership that can help shape research and ultimately improve neurological care.



Maria Varkanitsa

Maria Varkanitsa, PhD
Assistant Scientific Director



Antreas Charidimou

Antreas Charidimou, MD-PhD
Assistant Medical Director

Letters From the Assistant Directors

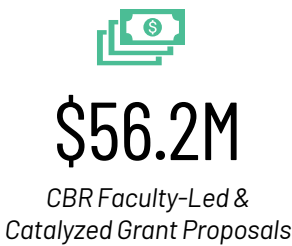
Partnering to Advance Brain Recovery

Partnership remains at the heart of the Center for Brain Recovery’s work. During FY26, more than 20 faculty members worked alongside students, postdoctoral scholars, researchers, clinicians, and collaborators across disciplines to advance research in brain health, neurological disease, and recovery.

The Center also engaged 42 unique students and postdoctoral scholars through paid employment, research training, internships, and other opportunities—creating pathways for the next generation of researchers to contribute directly to this work.

These relationships also continue to create opportunities for new research. During FY26, CBR faculty led or helped catalyze more than \$56.2 million in grant proposals, bringing together expertise from across Boston University and collaborating institutions. At the same time, \$8.7 million in grants were awarded in support of research aligned with the Center’s mission.

As we look ahead, we want to continue building these partnerships—with faculty and students, universities and healthcare organizations, foundations, industry, and community partners. By connecting people, expertise, and resources, the Center can help create new opportunities for discovery while extending the reach and impact of brain recovery research.



Matthew VanDemark

Matthew VanDemark
Assistant Director, Finance and Administration

SUPPORT OUR PROGRAMS

You can help support the continued success of the Center for Brain Recovery by contributing to our research fund. For more information on how to help, visit the Support Our Work page on our website: bu.edu/cbr/about/how-you-can-help/.



FY2026 Highlights



The 3rd annual Neuroscience of the Everyday World Conference at Boston University, co-hosted with the Tianqiao & Chrissy Chen Institute brought together over 240 registrants from around the world. July 2025.



CBR joins an international partnership with the Ewha Brain Institute in Seoul, South Korea. May 2026.

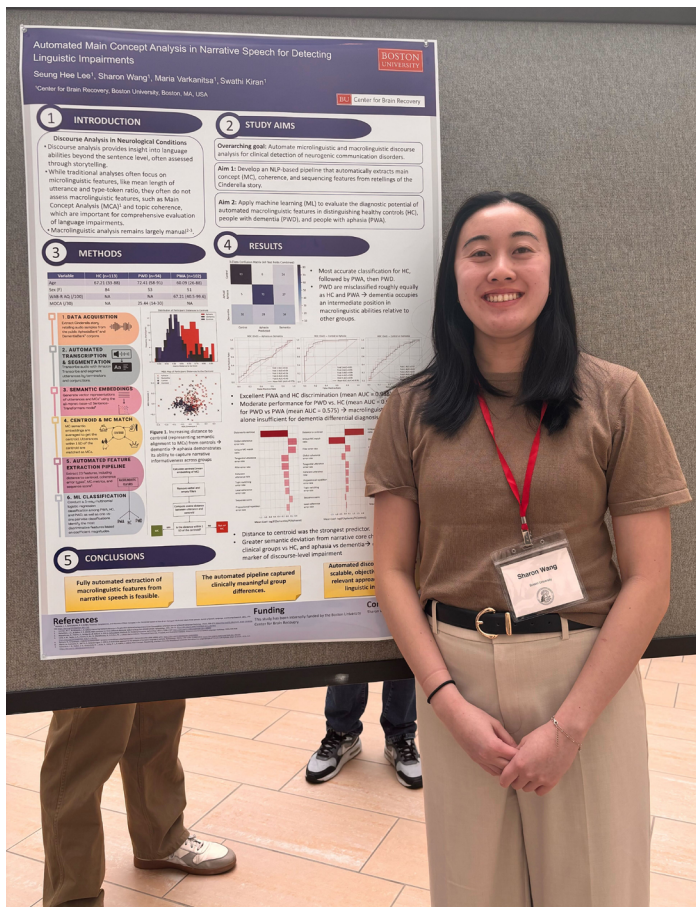


Boston University's Campus Resource Dog, Bean, visits CBR researchers. October 2025.



CBR researchers attend the Academy of Aphasia in San Diego, California. October 2025.

FY2026 Highlights



PhD Student, Sharon Wang, stands with her poster at the Human Sentence Processing Conference. March 2026.



Dr. Swathi Kiran moderates CBR's Boston Tech Week event, "Transforming Brain Health and Disease through AI." May 2026.



PhD Candidate, Erin Carpenter, shows Boston Public School students how to use fNIRS-EEG equipment. November 2025.



139

Peer-Reviewed Publications



95

Presentations by Students & Faculty



11

BU Departments Represented by Faculty



26

Honors & Awards



13

Center Events



750+

Event Attendees



7,600+

Social Media Followers

Mission Statement & Strategic Plan

Mission

The Center for Brain Recovery (CBR), now in its fourth year, was founded on the premise that the most intractable problems in clinical neuroscience such as stroke and post-stroke aphasia, traumatic brain injury, Alzheimer's disease and related dementias, cerebral small-vessel disease, and Parkinson's disease cannot be solved within the boundaries of any single discipline. CBR brings together clinicians, neuroscientists, engineers, and computer and data scientists across 11 departments within 5 BU schools and colleges around a shared translational mission: to detect neurological disorders early, understand the mechanisms that drive them, determine which treatments work for which patients, and enable recovery and success in the real world.

Research Efforts

CBR's research is organized into a single overarching framework: a continuous cycle of care spanning Prevention, Detection, Diagnosis, Treatment, and Prediction that deliberately moves beyond the fragmented, siloed models that characterize conventional neurorehabilitation. To accomplish these goals, research at CBR includes many different research methodologies and research themes. Figure 1 summarizes the overall research themes at the Center.

Alignment with Strategic Goals

These six research themes drive the work behind CBR's five strategic goals. Themes 1–3 that address real-world brain monitoring, biomarker discovery, and AI/data science directly build the detection, diagnosis, and prediction capabilities at the heart of **Goal 1: Advance precision brain health**, while Theme 5's clinical trials supply the validated, personalized interventions that goal calls for. The same discovery and trial work, published in high-impact journals and presented at national and international conferences, advances **Goal 2: Expand global research visibility and academic influence**. Themes 1–5 involve sustained collaboration among clinicians, engineers, and data scientists across schools and with Boston Medical Center, which is what **Goal 3: Strengthen interdisciplinary collaboration and leadership** is designed to deepen. The students and trainees are embedded in every research theme from hardware development to clinical trials and in direct alignment to **Goal 4: Enhance student development and mentorship**. Finally, Theme 4's focus on access and social determinants of health, together with Theme 6's advocacy work, is what sustains our final **Goal 5: Grow community and research participant engagement**, ensuring CBR's science reflects and serves the full population affected by neurological disease.

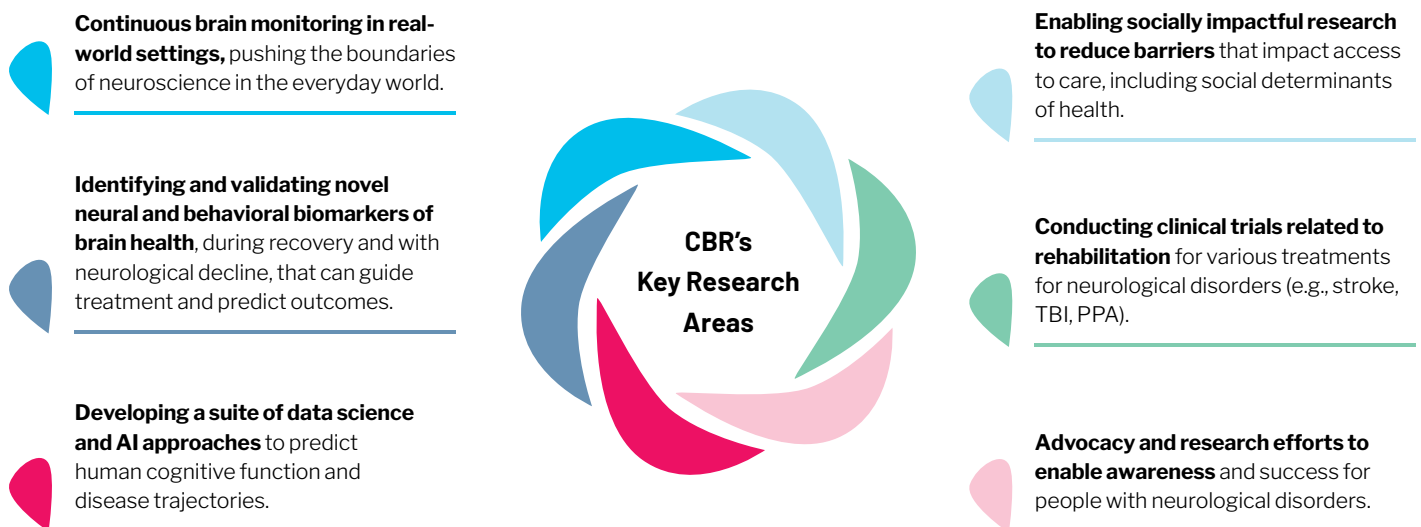


Figure 1: Main themes of activities at the Center for Brain Recovery.

Detect, Treat, Predict

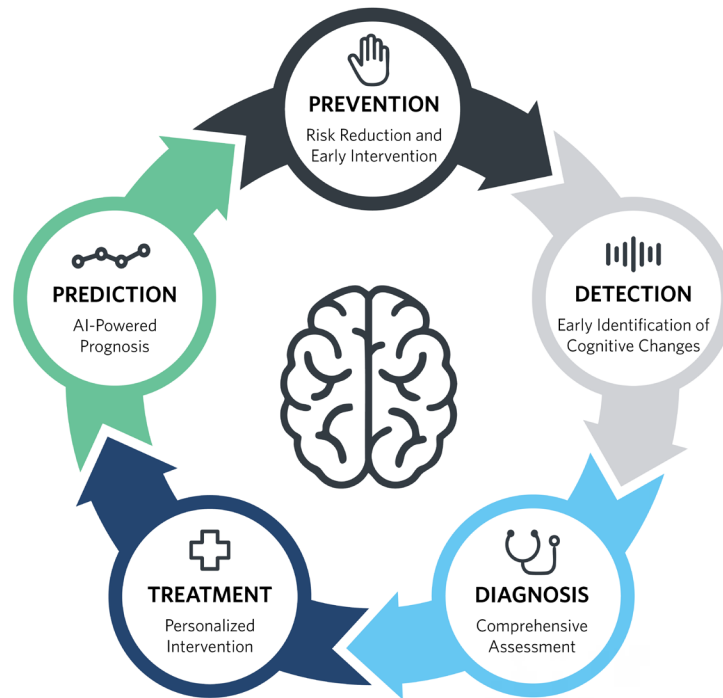


Figure 2: Prevention, Detection, Diagnosis, Treatment, and Prediction framework.

Over the past four years, the Center has organized its research into a single overarching framework — **a continuous cycle of care** that deliberately moves beyond the fragmented, siloed models that characterize conventional neurorehabilitation. Some examples of the work in each component include:

1. Prevention

- Research focuses on understanding **how lifestyle, social, and vascular factors influence brain health and cognitive aging**. Ongoing studies examine how cerebral small vessel disease interacts with factors such as loneliness, social isolation, and social support to affect cognitive function, stroke risk, recovery, and dementia outcomes.

2. Detection

- Research in this component focuses on the **early identification of cognitive and language changes using digital biomarkers**. For example, an automated tool analyzes five-minute speech samples for coherence, reference, and fluency to distinguish aphasia, dementia, and healthy aging.

3. Diagnosis

- Research in this component focuses on **improving diagnostic precision through multidimensional assessments of brain and cognitive function**. Researchers integrate information from brain imaging, lesion characteristics, structural and functional connectivity, and language assessments to better understand the mechanisms underlying cognitive and language impairments. Also, low-cost wearable EEG-fNIRS enable continuous brain monitoring and diagnosis.

4. Treatment

- The team is exploring research efforts that include digital therapy platforms, home-based treatment programs, non-invasive brain stimulation, conversation-based interventions, and rhythmic auditory stimulation to **develop and implement personalized rehabilitation**.

5. Prediction

- Research in this component focuses on using **artificial intelligence and machine-learning models to predict recovery, disease progression, and treatment response**. For instance, digital-twin models use brain and behavioral data to predict aphasia severity, treatment response, recovery, cognitive decline, and dementia risk. These technologies aim to support personalized care, optimize treatment decisions, and identify individuals at risk for future cognitive decline.



Translational Framework For Innovation in Cerebral amyloid angiopathy (TRAFFIC)

Antreas Charidimou, Marcel Verbeek, Matthew Schrag, Steven Greenberg, Mar Hernández Guillamon, Stephanie Schreiber, William Van Nostrand

To advance scientific understanding of Cerebral amyloid angiopathy (CAA), the [Leducq Foundation has awarded](#) Drs. Antreas Charidimou of Boston University and Marcel Verbeek of Radboud university medical center (Nijmegen, The Netherlands) an International Networks of Excellence Program award. This \$9 million, five-year grant will support their project, “Translational Framework For Innovation in Cerebral amyloid angiopathy.”

The goal of this research is to improve understanding of critical steps in the pathobiology and the early detection and diagnosis of CAA, an essential step toward enabling earlier interventions and developing future therapies. The international research team will combine advanced brain imaging with new molecular biomarkers and innovative experimental models. By studying brain scans, body fluids and tissues, and clinical data from patients worldwide, the researchers aim to uncover how CAA develops, progresses, and causes damage to the brain’s blood vessels, including inflammatory forms of the disease (CAA-related inflammation and ARIA); refer to Figure 3.

A core component of the initiative is training the next generation of CAA scientists. Through mentorship, funding, and hands-on opportunities across participating laboratories, the network will equip early-career researchers with the skills and collaborative experience needed to advance the field.

Drs. Charidimou and Verbeek, co-leaders of this research, both specialize in neurodegenerative disorders with expertise in CAA. Together, their complementary backgrounds bridge vascular and molecular approaches as well as fundamental and clinical research, helping to drive the research toward translational insights and clinical applications.

“By bringing together complementary expertise across clinical, molecular, and experimental research, TRAFFIC is designed to address these gaps while fostering the next generation of CAA investigators. We hope this network will have a lasting impact on the field and ultimately improve care for patients at risk of brain bleeds and cognitive decline.”

— Dr. Antreas Charidimou

“Over the past 10–20 years we have learned a lot about CAA, and this has evolved clinical diagnostic criteria. However, these [criteria] clearly fall short in identifying the entire spectrum of CAA, since they are solely focused on neuroimaging signs,” said Dr. Marcel Verbeek. “These are typically late-stage signs, whereas we know that molecular biomarkers will be abnormal earlier on. So, that is why we aim to work towards a new framework for diagnostics, incorporating the newest insights into molecular mechanisms.”

By integrating clinical, molecular, and experimental research, the TRAFFIC network aims to generate critical insights into the mechanisms of CAA, improve diagnostic strategies, lay the foundation for future therapies, and build a lasting international community of CAA researchers.

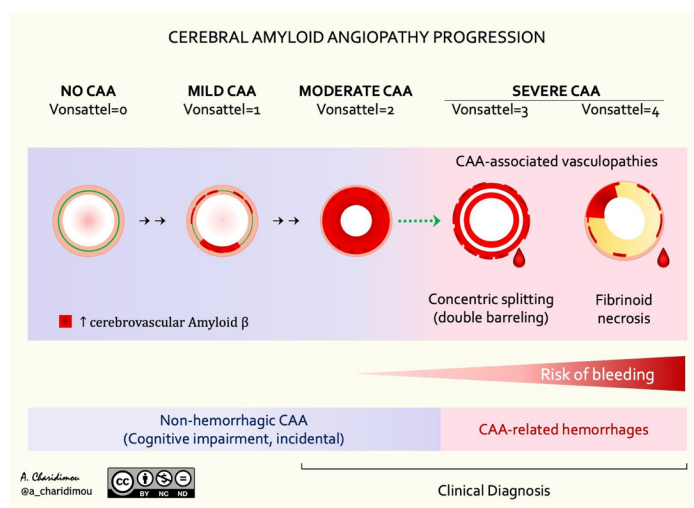


Figure 3: Cerebral amyloid angiopathy progression. © 2026 by Antreas Charidimou.



Antreas Charidimou
Assistant Professor,
NEU



Neuroscience of the Everyday World (N.E.W.)

Meryem Yücel, Alice Cronin-Golomb, Theresa Ellis, David Boas, Swathi Kiran

Traditional brain imaging requires a person to lie still in a machine, which tells us a lot about how the brain works in principle, but very little about how it functions during a real conversation, a walk down the street, or a meal with family. Whereas continuous brain monitoring allows researchers to study the brain as people go about their daily lives.

Anchored by a major NIH grant awarded to David Boas and Swathi Kiran, the research team at CBR has tested a lightweight, wearable brain-monitoring headgear that uses functional near infrared spectroscopy (fNIRS) to track blood flow changes in the brain. This past year, we expanded the technology's use to stroke survivors, people living with dementia, and everyday activities. A few highlights:

■ **Understanding conversation after stroke:** Emily Braun, a former CBR PhD student, and colleagues (2025, Imaging Neuroscience) showed that our wearable system can reliably pick up brain activity in people with aphasia during natural, everyday conversation, which was a first step toward using real-world conversation itself as a window into brain recovery.

■ **Detecting the brain's compensation strategies in dementia:**

Shalom Henderson, a postdoctoral associate within CBR, and colleagues applied the same approach to people with Alzheimer's disease and related dementias, grouped by cognitive test scores. They found that individuals with more advanced cognitive impairment showed a distinct pattern of brain activity on the right side of the brain while speaking, a possible sign that the brain is recruiting extra resources to compensate as it struggles.

■ **Measuring the mental cost of multitasking:**

Shannon Kelley, a PhD Candidate within David Boas' lab, and colleagues tested how much harder the brain has to work when people answer questions while sitting, standing, or walking; see Figure 4. The findings map in the brain how "everyday multitasking" like talking and walking is different when people are sitting down, with implications for people recovering from brain injury who often struggle with these kinds of dual tasks.

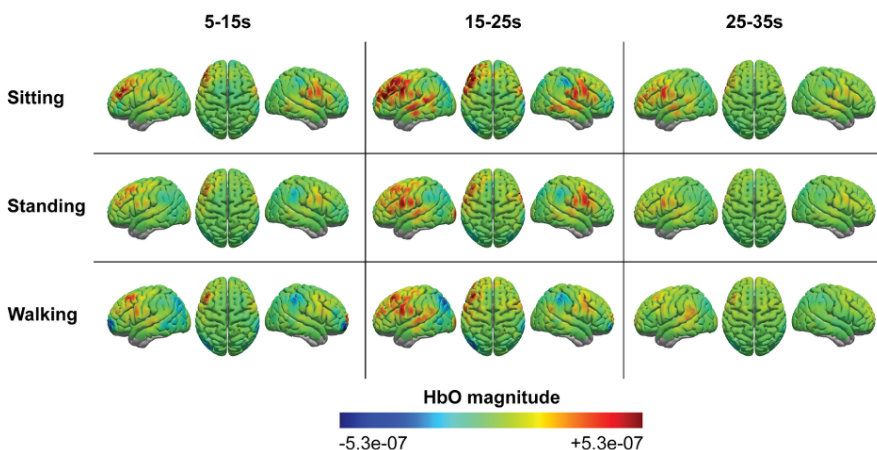


Figure 4: Kelley et al., paper studying brain activation during sitting and talking, standing and talking and walking and talking conditions

Group average image reconstruction results showing the change in HbO concentration (M) on the brain for all three tasks for different windows of time. At $t=5$ seconds, the participant begins speaking, and at $t=25$ seconds, the participant stops speaking. Color bar ranges from $-\frac{1}{2}$ to $+\frac{1}{2}$ maximum concentration value for the sitting condition.



David Boas
Professor,
BME, ECE



Swathi Kiran
James and Cecilia Tse
Ying Professor, SLHS



Alice Cronin-Golomb
Professor,
PBS



Theresa Ellis
Professor,
PT



Meryem Yücel
Research Associate
Professor, BME



Redefining Cognitive Aging and Alzheimer's Disease Through Next-Generation Digital Cognitive Biomarkers

Stacy Andersen, Katherine Gifford, Swathi Kiran, Shariq Mohammed, Huitong Ding, Phillip Hwang, Stefano Monti

Changes in memory and thinking often become noticeable only after changes in the brain have been developing for years. This creates a major challenge for Alzheimer's disease and related dementias: by the time cognitive difficulties are apparent in everyday life or detected during a clinical visit, opportunities for the earliest intervention may already have been missed. At the same time, biological markers such as amyloid and tau do not tell the whole story, as some people can have substantial Alzheimer's-related pathology without ever developing dementia. Researchers therefore need better ways to understand **who is truly beginning to experience cognitive decline, how early those changes can be detected, and how they evolve over time.**

A new interdisciplinary initiative at Boston University is exploring whether the answer may already be hidden in the digital information people generate while completing cognitive tests, speaking, writing, moving, and sleeping. Funded by the Hariri Institute, this project brings together investigators from medicine, neuropsychology, speech and language sciences, epidemiology, biostatistics, engineering, computational biology, and data science. The goal is to develop sensitive, scalable measures of cognitive health that could ultimately complement traditional clinical assessments and biological biomarkers.

At the heart of the project is the concept of a **digital biomarker**: a measurable feature captured using technology that provides information about a person's health or function. For example, a standard memory test may ultimately produce a single score, but a digital recording of the same test contains much richer information. Researchers can examine how quickly someone speaks, how often they pause, the words and sentence structures they use, and subtle changes in their voice. Similarly, a digitally recorded drawing or writing task can reveal not just

whether the final answer was correct, but how the person produced it, including the speed and timing of pen movements, hesitations, and other fine-motor patterns. Artificial intelligence and machine-learning methods make it possible to analyze thousands of these subtle features and identify patterns that might be difficult to recognize by eye.

The initiative is organized around **three interconnected research thrusts**, each capturing a different window into cognitive and brain health. The first, **Active, Test-Based Digital Cognitive Biomarkers**, focuses on information within voice recordings and digital pen data collected during cognitive assessments, such as changes in speech, language, writing, and drawing. The second, **Passive Digital Cognitive Biomarkers**, uses wearable and continuous-monitoring technologies to examine everyday patterns of physical activity, movement, gait, and sleep. The third, **Multimodal Digital Biomarker Signatures**, brings these different digital signals together and connects them with biological measures such as brain imaging, blood biomarkers, genetics, and other molecular data. Together, the three thrusts move from individual digital measures toward a more comprehensive picture of cognitive health and risk for Alzheimer's disease and related dementias.

A major strength of the project is access to extensive digital data already collected through some of Boston University's landmark studies of aging and longevity, including the **Framingham Heart Study, New England Centenarian Study, and Long Life Family Study**. These studies follow thousands of individuals across the lifespan and also include detailed information about cognition, medical history, lifestyle, genetics, brain imaging, and other biological measures.



Stacy Andersen
Associate Professor,
Geriatrics



Swathi Kiran
James and Cecilia Tse
Ying Professor, SLHS

Figure 5: This research thrust has three main components: 1. Active Test-Based Digital Cognitive Biomarkers, 2. Passive Digital Cognitive Biomarkers, and 3. Multimodal Digital Biomarker Signatures



Diagnostic Accuracy of the Boston Criteria v2.0 in Memory Clinic Patients

Emerson Kropp, **Maria Varkanitsa**, Thor D. Stein, Katherine Turk, Michael L. Alosco, **Yorghos Tripodis**, **Jose Rafael Romero**, **Swathi Kiran**, Andrew E. Budson, for the Alzheimer's Disease Neuroimaging Initiative, **Antreas Charidimou**

Cerebral amyloid angiopathy, or CAA, is a common disease of the brain's small blood vessels that becomes increasingly frequent with age. In CAA, a protein called amyloid builds up in the walls of blood vessels in the brain, making them more fragile and affecting the health of surrounding brain tissue. CAA is an important cause of bleeding in the brain, but it can also contribute to cognitive decline and frequently occurs alongside Alzheimer disease.

Identifying CAA during life, however, is not always straightforward. Clinicians commonly rely on a set of MRI-based diagnostic guidelines known as the **Boston Criteria**, which identify characteristic patterns of brain injury associated with the disease. These criteria were developed and validated largely in patients with the more recognizable, bleeding-related forms of CAA. Increasingly, however, clinicians encounter CAA in a very different setting: memory clinics, where patients are being evaluated primarily because of changes in memory or thinking and may have few or none of the classic signs of bleeding on their brain scans.

A recent study led by investigators at the BU CBR asked an important question: **How well do the Boston Criteria identify CAA in this memory clinic population?** The researchers compared CAA diagnoses made from MRI scans with findings from examination of brain tissue at autopsy, which provides the most definitive evidence of whether CAA was actually present.

The study found that the updated **Boston Criteria v2.0** identified more patients with CAA than the previous version, but this improvement came with a trade-off: more individuals without substantial CAA were also classified as having the disease. Overall, the newer criteria did not substantially improve diagnostic accuracy in this population.

These findings reveal an important limitation in how CAA is currently detected. **CAA does not necessarily look the same across different groups of patients.**

MRI criteria that perform very well when CAA presents with its characteristic brain hemorrhages may be less effective when the disease is subtler and occurs in people seeking care for cognitive impairment. In these patients, significant vascular disease may be present even when the familiar MRI warning signs of CAA are limited or absent.

The issue has become particularly timely with the introduction of new anti-amyloid treatments for Alzheimer disease. These therapies can cause a complication known as **amyloid-related imaging abnormalities, or ARIA**, which can involve brain swelling or bleeding. Because underlying CAA may increase vulnerability to these complications, knowing whether a patient has CAA is becoming increasingly relevant not only for understanding the causes of cognitive decline, but also for making informed treatment decisions and assessing treatment-related risk.

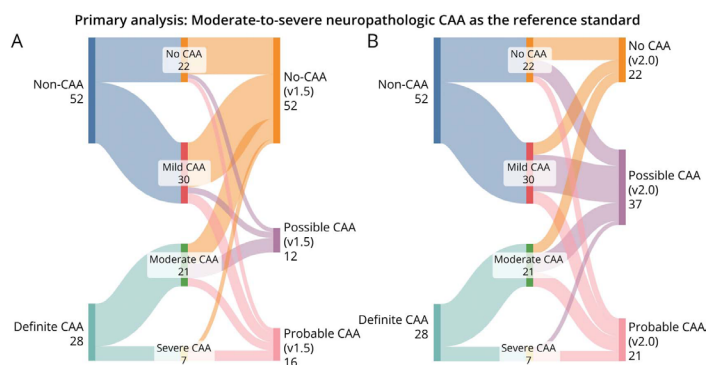


Figure 6: A and B correspond to the primary analysis, using moderate-to-severe neuropathologic CAA ("definite CAA") as the reference standard, with classifications based on Boston Criteria v1.5 in panel A and Boston Criteria v2.0 in panel B. Compared with v1.5, Boston Criteria v2.0 shift more patients toward possible/probable CAA classifications, particularly through expansion of the possible CAA category, with a corresponding reduction in specificity.



Antreas Charidimou
Assistant Professor,
NEU



Maria Varkanitsa
Research Assistant
Professor, SLHS



Yorghos Tripodis
Professor,
SPH



Rafael Romero
Associate Professor,
NEU



Swathi Kiran
James and Cecilia Tse
Ying Professor, SLHS



Bringing Neuromodulation and Structured Language Treatment into the Home

Maria Varkanitsa, Anna Serrichio

“One of the most exciting aspects of this project is that the entire treatment program takes place in the participant’s home. By combining remotely supervised neurostimulation with digital language therapy, we hope to make intensive aphasia rehabilitation more accessible to people who may otherwise face barriers related to travel, mobility, or distance from specialized care.”

— Dr. Maria Varkanitsa



Maria Varkanitsa
Research Assistant
Professor, SLHS

For people living with aphasia after stroke, intensive rehabilitation can be difficult to access, particularly when treatment requires frequent trips to a clinic or research center. Drs. Varkanitsa and Serrichio are testing a new, home-based approach that combines **remotely supervised transcranial direct current stimulation (rs-tDCS)** with **digital language therapy using the Constant Therapy app**.

tDCS is a noninvasive technique that uses a very low electrical current delivered through electrodes placed on the head to gently influence brain activity while a person is actively engaged in language therapy. In this study, stimulation is applied over the **cerebellum**, a region at the back of the brain that is now understood to contribute to **cognitive and language functions** in addition to its classical role in motor control, through its connections with language regions in other parts of the brain.

After an initial in-person training visit, participants complete treatment sessions from home while connected by video-conference with a member of the research team. Research staff supervise placement of the stimulation equipment and monitor each session, while participants complete language exercises on Constant Therapy. By bringing neuromodulation and structured language treatment directly into the home, this approach could ultimately make intensive aphasia rehabilitation **more accessible, scalable, and easier to integrate into everyday life**.

The study is examining both whether this remotely supervised treatment can be delivered safely and reliably and whether it can improve outcomes such as naming, everyday communication, and discourse.

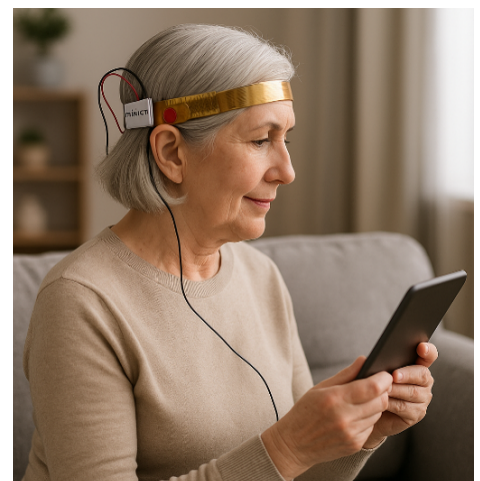
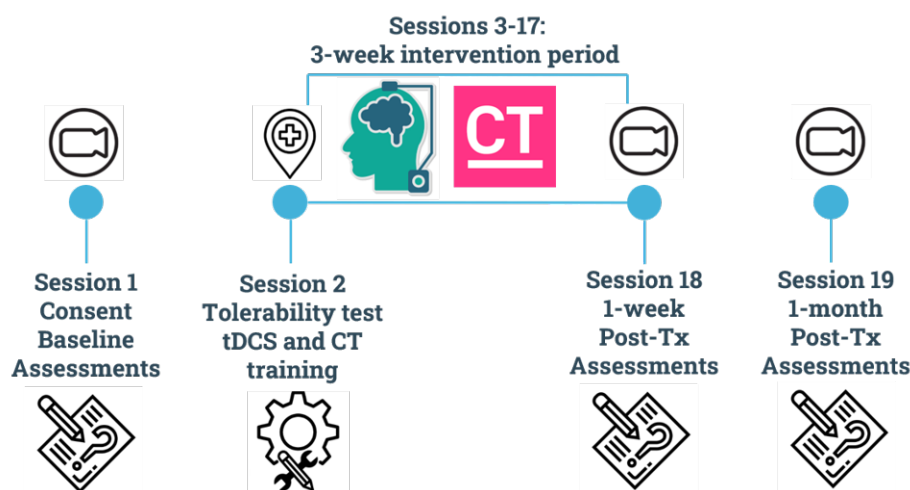


Figure 7: Study design and timeline of the 3-week remotely supervised tDCS plus Constant Therapy intervention.



Machine Learning Methods for Predicting Post-Stroke Aphasia and Language Recovery

Archana Venkataraman, Swathi Kiran, Prakash Ishwar, Maria Varkanitsa

In 2025, Drs. Archana Venkataraman and Swathi Kiran were awarded a \$3.2M NIH grant from the National Institute on Deafness and Other Communication Disorders to develop computational tools that will predict language recovery in people with post-stroke aphasia.

Venkataraman, an expert in machine learning, and Kiran, a clinician-scientist with deep expertise in neuroscience and language rehabilitation, are combining their complementary skills to create AI-driven models to advance our abilities to treat aphasia.

This research is an interdisciplinary effort with fellow CBR faculty— Prakash Ishwar, Maria Varkanitsa, and the development of the project included contributions from the late Margrit Betke.

The project aims to address a critical public health need by developing new tools that leverage deep neural networks to learn and identify brain-based biomarkers for language recovery. These tools will be used to reliably predict personalized rehabilitation outcomes for individuals with post-stroke aphasia.

“The goal of this work is to use advanced machine learning models to estimate and forecast how patients recover their language skills over time and what aspects of brain function best predict this recovery,” said Dr. Swathi Kiran. “Once we can

develop such advanced models, we can use this information in better decision support tools and for personalized treatment planning.”

Utilizing neuroimaging and demographic data, this project will create novel computational models capable of identifying predictive patterns about language improvement over time for people with aphasia. This work will continue building upon recent innovations in artificial intelligence and apply these advancements to datasets of chronic post-stroke aphasia.

This collaboration amongst CBR faculty from a diverse array of disciplines— including engineering, computer science, and speech-language science— exemplifies the Center for Brain Recovery’s mission of bringing together an interdisciplinary group of researchers to address the complex challenges of treating, curing, and preventing neurological disorders.



Archana Venkataraman
Associate Professor,
EECS



Swathi Kiran
James and Cecilia Tse
Ying Professor, SLHS



Prakash Ishwar
Professor,
EECS



Maria Varkanitsa
Research Assistant
Professor, SLHS

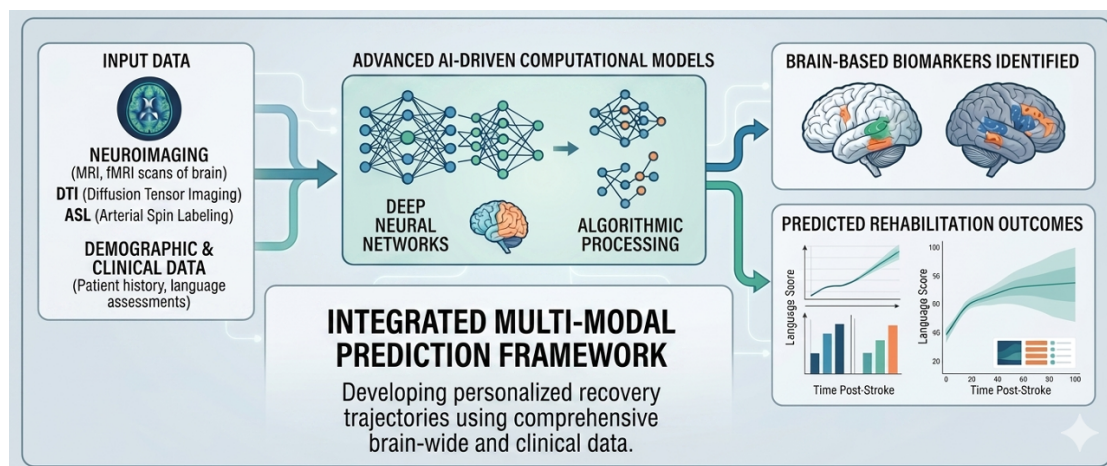


Figure 8: The goal of this project is to use, as input to models, multimodal data that includes MRI and fMRI scans of the brain and clinical-behavioral data. This information is fed into deep learning models that attempt at identifying brain-based biomarkers as well as predicting rehabilitation and longitudinal outcomes.



Predicting Bilingual Aphasia Treatment Outcomes Using Digital Twins: A Double-blind Randomized Controlled Trial

Swathi Kiran, Erin Carpenter, Uli Grasemann, Michael Scimeca, Manuel J. Marte, Marissa Russell-Meill, Claudia Peñaloza, **Yorghos Tripodis**, Risto Miikkulainen

Individuals who develop aphasia following a stroke or brain injury can experience difficulties communicating that disrupt their daily life and often require language rehabilitation. For multilingual patients with aphasia, the language recovery process becomes even more complicated because the impairment can have varying effects on all of the languages they speak.

Cases of bilingual and multilingual aphasia raise important questions for patients, clinicians, and researchers as to which language patients should receive treatment in.

A recent study published in *npj Digital Medicine*, and coming out of the Boston University Center for Brain Recovery, addresses this question by evaluating the performance of BiLex, a novel computational model developed to predict the optimal treatment language for bilinguals with aphasia.

Unlike other commonly used artificial intelligence models, BiLex is designed to simulate the organization of a human brain. It is capable of replicating how languages are stored and accessed, as well as how they have been impaired due to stroke. BiLex acts as a “digital twin”, by effectively creating a copy of an individual’s language system and mapping out three interconnected structures: word meaning, English phonetics, and Spanish phonetics.

The design of BiLex allows researchers to safely test different therapy treatments on an individual by simulating what the results may be.

This study was conducted by researchers at CBR alongside collaborators at the University of Texas at Austin and the University of Barcelona. Led by CBR’s Dr. Swathi Kiran and UT Austin’s Dr. Risto Miikkulainen, the team consisted of an interdisciplinary group of experts in aphasia, biostatistics, and computer science working together to apply machine learning techniques to rehabilitation prediction.

In a double-blind randomized controlled trial, 48 Spanish-English bilinguals diagnosed with aphasia were treated in either Spanish or English, with half of the participants receiving treatment in the language prescribed by the digital twin simulation and the other half being treated in the opposite language from their personalized recommendation.

When simply looking at group-level differences between the patients who followed the model prescription versus the placebo, there were no significant differences between the groups. However, when the patients were subcategorized into smaller cohorts organized by language history or how severe their aphasia was, the researchers found that the digital twin simulations accurately captured these differences between people.

These results show that bilingual aphasia recovery is complex and demonstrate the potential of computational models to guide rehabilitation strategies. As the field of computational modeling advances, these tools will become increasingly valuable for developing personalized therapy plans that account for the unique linguistic profiles of patients.

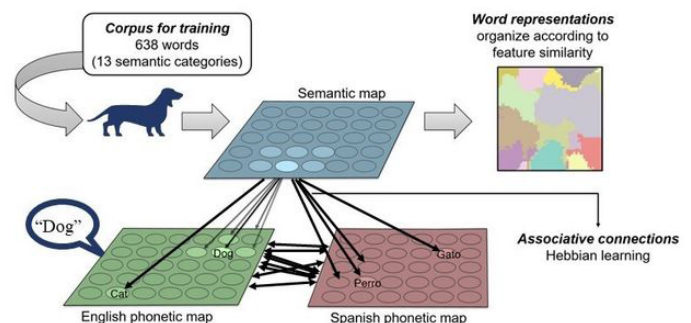


Figure 9: Annotated architecture of the BiLex model. The model consists of three computational Self Organizing Maps (SOMs) –one for the semantic representations of words shared across languages, and two for the phonetic representations of words in each language.

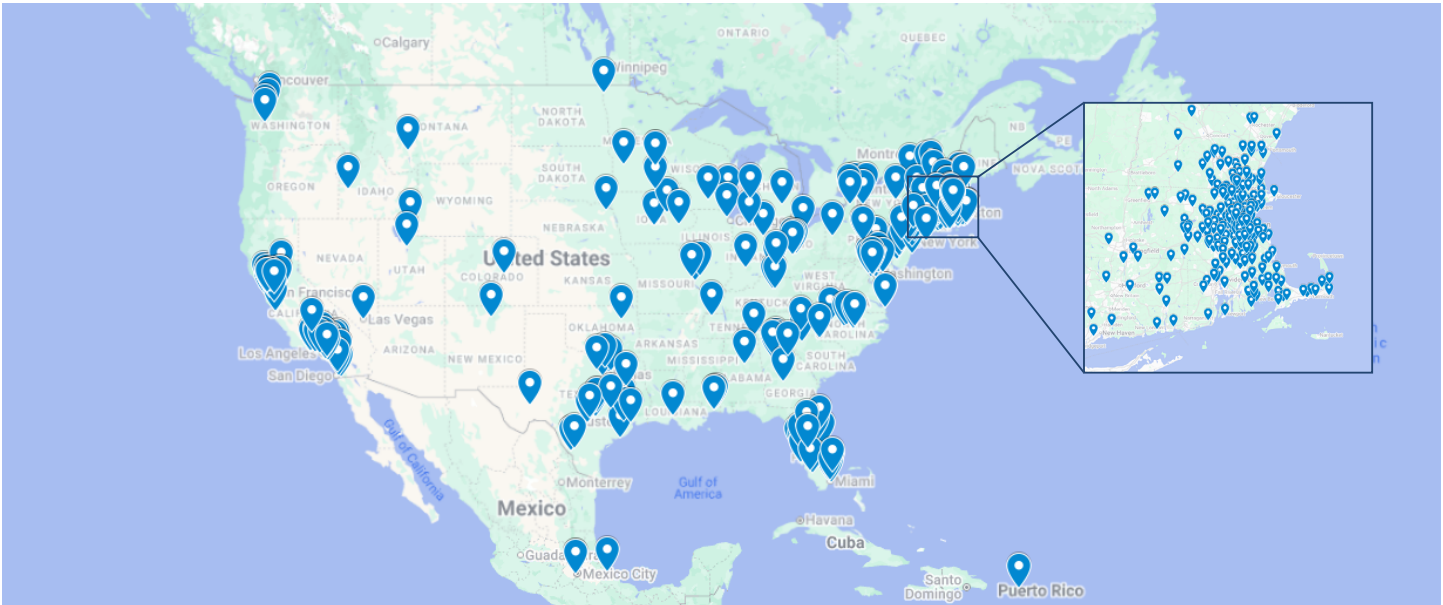


Swathi Kiran
James and Cecilia Tse
Ying Professor, SLHS



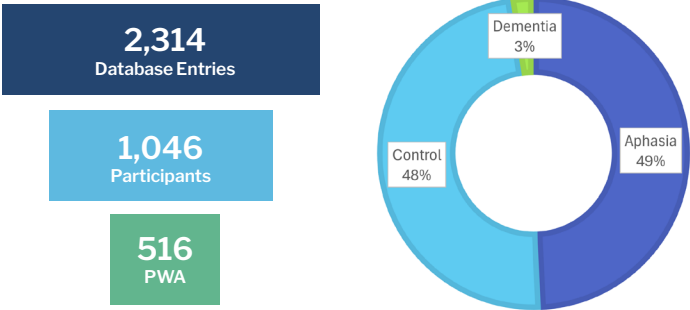
Yorghos Tripodis
Professor,
SPH

Patient Research Registry



Rich Database of Potential Participants

Over the years, CBR has established a broad regional and national infrastructure for identifying and engaging research participants. At its core is an actively curated research registry containing information on 1,046 richly phenotyped participants—516 with post-stroke aphasia, 24 with ADRD, and 506 healthy adults recruited from across the country. This registry involves the collaboration of several CBR core faculty. Since January 2025, CBR has screened 475 individuals across acute and chronic stroke, and dementia. National partnerships—including organizations such as the National Aphasia Association, Cecropia Strong, and Stroke Onward—support dissemination of recruitment information to community-dwelling individuals with aphasia across the United States.





Rafael Romero
Associate Professor,
NEU



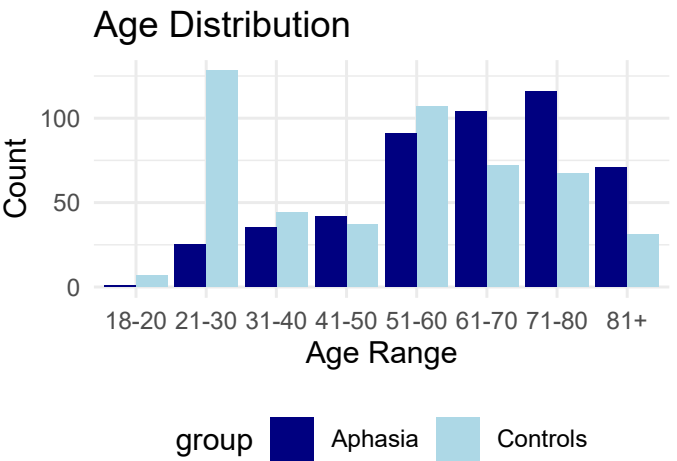
Maria Varkanitsa
Research Assistant
Professor, SLHS



Hugo Aparicio
Associate Professor,
NEU



Antreas Charidimou
Assistant Professor,
NEU



Undergraduate Research Assistant Program

Each semester, the Center for Brain Recovery welcomes new and returning undergraduate students to gain hands-on research experience while receiving mentorship from faculty, postdoctoral associates, and PhD students. Through project teams, research-for-credit opportunities, and the Undergraduate Research Opportunities Program (UROP), students contribute to ongoing studies, support future publications, and pursue independent research projects of their own.

Gaining Research Experience

Helen Blans (CAS '26) joined CBR the summer before her senior year, becoming a member of Shalom “Shaz” Henderson’s research team and functional near-infrared spectroscopy (fNIRS) study. Shaz provided Helen hands-on training, teaching her how to use the fNIRS equipment and data collection procedures, as well as the fundamental steps of the research process.

“My mentor, Shaz, has basically taught me everything that I know about research at this point,” Helen said.

In Fall 2025, Helen was selected to receive UROP funding for her project titled, *Resting-State Functional Near Infrared Spectroscopy Across the Alzheimer’s Disease Spectrum*. With Shaz continuing as her mentor, Helen pursued the opportunity as a chance to gain experience running her own project, designing experimental methods, and writing a research paper.

Throughout the semester, Helen was able to collect and analyze resting-state fNIRS data in individuals on the Alzheimer’s disease spectrum. By the end of her senior year, she completed her manuscript.

“CBR has set me up for applying to grad school,” Helen expressed. “I have a lot more research experience and I feel a lot more confident about my interests for the future... the project that I have been on is a dementia project and it has really inspired my interest in dementia and Alzheimer’s research, so I’m actually planning on continuing down that path with graduate school.”

Discovering Research Passions

As a UROP funding recipient, Amelia Andre (CAS '27) examined eye tracking data and memory task performance to investigate the cause of rereading behavior in individuals with and without aphasia. Her project titled, *Examining the relative contributions of memory and language during rereading in individuals with aphasia*, was co-mentored by Maria Varkanitsa, CBR’s Assistant Scientific Director, and Michael Scimeca, a PhD Candidate at the Center.

From her time administering clinical testing on CBR project teams, Amelia said that she found herself drawn to tasks related to memory. “I became curious about the role memory plays in sentence processing, and rereading behavior seemed like



Helen Blans wears the fNIRS-EEG equipment to demonstrate how the data collection process works.



Monthly CBR Social Events allow undergraduate students to connect with PhD students, postdocs, research assistants, visiting scholars, faculty, and staff outside of the lab. (From left to right) Erie Shivers, Ihintza Malharin, Ligia Sibauste, Erin Carpenter, Divya Sivakumar, and Emerson Kropp enjoy apple picking in early fall 2025.



Research Assistant and BU graduate, Emerson Kropp, discusses MRI neuroimaging scans with undergraduate student, Joshua “Drake” Sullivan. Emerson Kropp is now a medical student at Vanderbilt University

an interesting lens to explore this through. Since rereading impacts people with and without brain injuries, I thought it would be interesting to explore how this behavior shows up in both groups, and what that might reveal about cognitive processing.”

Since completing her UROP, Amelia noted that the experience had a very positive impact on her time at Boston University. Contributing to a variety of projects at CBR has given her experience using relevant technology, conducting data analysis, and interacting with participants. “It has helped me solidify my interest in pursuing a career in neuroscience research,” Amelia said.

Working with Participants

For many CBR undergraduate research assistants, the Center provides their first opportunity to conduct research sessions with participants.

When asked about the skills she has developed at CBR, Divya Sivakumar (CAS ’27) said, “I think the biggest thing is getting to work with patients. I’ve never had that kind of experience before. And I think everything that I’ve been able to learn from it has been super transformative.”

As an intermediate Spanish speaker, Divya was added to the R01 Computational Bilingual Modeling study where she has been able to get involved with many different steps in the research process. She has participated in recruitment efforts, meeting with participants, semantic error coding, and assessment scoring.

Divya was inspired to join CBR after she attended a presentation by Dr. Swathi Kiran at a research symposium hosted by the BU Mind & Brain Society. She was fascinated to hear about how the Center was integrating data science with neuroscience and appreciated CBR’s focus on the individual patients.

Clinical Applications

Isabel Yu (CAS ’27) first joined the Center for Brain Recovery in her freshman year, volunteering with the Conversation, Health, Art, Technology (CHAT) Program. As a sophomore, she moved over to the research side, becoming an undergraduate research assistant supporting work examining emotional reactivity during naturalistic movie-watching, as well as research on reading and language processing in Spanish-English bilinguals with aphasia.

Throughout her time at CBR, she has been able to prepare experimental materials, score and organize behavioral and language assessments, and gain direct experience testing bilingual participants.

“My experiences at CBR have strengthened both my interest in neuroscience and my desire to pursue a career that combines research with patient care,” said Isabel. “As someone who is hoping to pursue an MD, PhD, or both, working with aphasia research has shown me how basic questions about the brain and language can translate into clinically meaningful work, while also giving me research, analytical, and collaborative skills that I hope to carry into medical school and/or further research training.”

The ICCR Program

Returning to College after Injury with a Change in Mindset

Overcoming Injury

Theo Visco was a sophomore in college when he experienced a helmeted ski accident in March 2025 that put him in a coma for five days. The accident left him with an acquired brain injury (ABI) that was disrupting his memory and attention.

Theo spent a month and a half in the inpatient hospital. It was there that Theo's speech-language pathologist suggested he consider joining Boston University's Intensive Cognitive and Communication Rehabilitation (ICCR) Program to help him return to school again.

Education as a Catalyst for Recovery

On the first day of ICCR classes, Theo was welcomed into a cohort of three other students and met his assigned graduate student clinician. Theo quickly recognized that he was surrounded by students in a similar situation to him and clinicians who genuinely cared about helping him achieve his goal of returning to college.

Throughout the summer, Theo took a Geology course where he could practice listening to lectures, working on memory exercises, completing homework assignments, and preparing for test taking.

From his time in ICCR, Theo was able to identify two key challenges that had been affecting his academic success: pressure and procrastination. Working closely with the team of ICCR clinicians, he was able to address these patterns by learning effective strategies for managing academic stress and developing stronger time management skills.

“[ICCR] has definitely been the most helpful thing in my recovery, I don't know where I'd be without it. I attribute so much of my recovery to this program.”

— Theo Visco, ICCR Participant



Theo Visco presents during ICCR Immersion Week hosted in Boston.

The Power of Embracing Positivity

After completing one semester with the ICCR Program, Theo returned to the University of Vermont full-time.

Just nine months following his injury, he completed the first semester of his junior year and performed even better academically than he did before his ABI. This accomplishment is exemplary of the hard work he put in, the progress he has made, and his ability to maintain the helpful academic habits he developed in the ICCR Program.

■ **Participants:** To learn more about the ICCR Program, contact the program's Clinical Director, Meredith MacEachern, via email at mermac@bu.edu.



Meredith MacEachern
ICCR Program Director

ABOUT ICCR

The ICCR program is a comprehensive, contextualized cognitive rehabilitation program for young adults with acquired brain injury (ABI) who wish to enter or return to college-level or higher education but are unable to do so due to their cognitive and communication challenges. The ICCR program uses individual, group, and functional-based therapy to simulate a college semester in which therapeutic support is provided and both impairment-based and functionally focused therapy tasks are integrated within the program. The program is offered year-round and runs entirely on Zoom.

The CHAT Program

Building Community Through Conversation

As a volunteer for the Conversation, Health, Art, Technology (CHAT) Program, Swara Subramanian (SAR '28) has gained firsthand experience supporting individuals with aphasia while learning how communication and rehabilitation intersect in real-world settings.

"I felt very motivated to join and contribute to creating a supportive environment for individuals with aphasia," said Swara.

Each week, Swara helps prepare materials and facilitate group sessions, where participants engage in discussions, read articles aloud, and complete language-based activities and games designed to encourage conversation and build confidence.

A Weekly Space for Support and Connection

Sessions begin with participants sharing updates from their week before moving into themed discussions on topics such as aphasia awareness, rehabilitation research, and speech-language therapy. While conversations often focus on a planned topic, the goal is to create a space where participants feel comfortable expressing themselves and connecting with others.

For Swara, one of the most rewarding aspects of the program has been witnessing the sense of community that develops between members.

"One of the most valuable aspects of CHAT is the sense of community we create through our conversations," she said. "It is incredibly meaningful to watch new participants be warmly welcomed into the group, become more comfortable over time, and gain confidence in expressing themselves through the connections and supportive environment that CHAT provides."



CHAT, which stands for Conversation, Health, Art, Technology, is a dedicated and compassionate resource group with the mission of creating a supportive community for individuals with aphasia.

Preparing for a Future in Speech-Language Pathology

As she looks toward a career in speech-language pathology, Swara says the experience has shaped how she thinks about client care and communication rehabilitation.

"I have also learned that supporting individuals with aphasia goes beyond speech and language exercises. It involves creating an environment where people feel heard, included, and confident in their ability to express themselves."

The program has strengthened her interest in the field and reinforced the importance of combining clinical knowledge with genuine human connection.

"CHAT has prepared me to work with clients in a meaningful and compassionate way while teaching me how to build lasting, supportive connections with the people I work with," she said. "It has strengthened my interest in speech-language pathology and has given me valuable experience understanding how communication, rehabilitation, and meaningful human connection can work together to support clients. I will take what I have learned in CHAT into my experiences as a future SLP."

For students interested in speech-language pathology, neuroscience, or rehabilitation sciences, opportunities like CHAT provide valuable experiences that extend beyond the classroom while making a meaningful impact on the lives of individuals living with aphasia.

- **Participants:** Sign up at <http://eepurl.com/ije5kv> or contact letschat@bu.edu.
- **Researchers:** Want to discuss your research with the group? Connect with us by emailing letschat@bu.edu.

ABOUT CHAT

The Center for Brain Recovery's Conversation, Health, Art, Technology (CHAT) Program is an aphasia resource group that meets weekly to provide individuals with aphasia a supportive environment to practice communication, build confidence, and connect with others who share similar experiences. Through guided conversations, educational discussions, and interactive activities, participants have opportunities to express themselves while engaging with topics relevant to communication and rehabilitation.

CBR Brain and Behavior Research Seminar Series

YouTube: @BUCenterforBrainRecovery

Beginning in Fall 2025, the Brain and Behavior Seminar Series is now organized around three interconnected themes:

- **Detect / Diagnose** – advances in digital phenotyping of neurological disorders
- **Treat** – technology-enhanced or stimulation-based therapeutic approaches
- **Predict** – modeling and forecasting of cognitive and language outcomes

JULY 14, 2025

Jennifer Mack, University of Massachusetts Amherst

- ❖ “Improving Communication Partners’ Comprehension of People with Aphasia: A Language Processing-Based Approach”
- ❖ [Watch the recording on YouTube](#)

SEPTEMBER 15, 2025

Simona Mancini, Basque Center on Cognition, Brain & Language

- ❖ “Dynamic interplay between language and domain-general functions”
- ❖ [Watch the recording on YouTube](#)

DETECT / DIAGNOSE

SEPTEMBER 29, 2025

Rhoda Au, Boston University

- ❖ “Precision Brain Health: Getting from Here to There”
- ❖ [Watch the recording on YouTube](#)

NOVEMBER 17, 2025

Jet Vonk, University of California, San Francisco

- ❖ “Quantifying Language in Dementia through Automated Speech Analysis”

DECEMBER 15, 2025

Fatemeh Geranmayeh, Imperial College London

- ❖ “Online monitoring technology for deep phenotyping of cognitive impairment after stroke”
- ❖ [Watch the recording on YouTube](#)

TREAT

FEBRUARY 24TH, 2026

Alex Leff, University College London

- ❖ “Practice-induced changes in brain structure: evidence from two app-based trials in people with aphasia”
- ❖ [Watch the recording on YouTube](#)

MARCH 9, 2026

Jessica Richardson, University of New Mexico

- ❖ “Toward Precision Neurorehabilitation in Primary Progressive Aphasia: Lessons from Review, Modeling, and Remote Intervention”
- ❖ [Watch the recording on YouTube](#)

APRIL 27, 2026

Kyrana Tsapkini, Johns Hopkins

- ❖ “Electrical stimulation in neurodegenerative disorders: efficacy, mechanisms and new trends”
- ❖ [Watch the recording on YouTube](#)

PREDICT

MAY 18, 2026

Leonardo Bonilha, University of South Carolina

- ❖ “White Matter, Brain Health and Digital Twin in Aphasia Recovery”
- ❖ [Watch the recording on YouTube](#)

JUNE 29, 2026

Ajay Halai, University of Cambridge

- ❖ “Leveraging AI to improve diagnosis and prognosis in post-stroke aphasia”
- ❖ [Watch the recording on YouTube](#)

Neuroscience of the Everyday World (N.E.W.) Conference 2025

July 28–29, 2025



Travel Award Winners sit on stage for the student-led panel, reflecting on the conference.



248

Conference Registrants



16

Speakers & Panelists



53

Poster & Oral Abstract
Presentations

The 3rd Annual Neuroscience of the Everyday World (N.E.W.) Conference, held at Boston University, brought together a global community of researchers and industry leaders to explore how emerging technologies are transforming the study of brain function in real-world settings.

Co-hosted by BU's Center for Brain Recovery and Center for Neurophotonics and supported by the Chen Institute, the sold-out, two-day event featured keynote talks, interdisciplinary symposia, a neurotechnology panel, poster sessions, and networking opportunities. With attendees from more than a dozen countries, the conference highlighted advances at the intersection of neuroscience, engineering, and AI, all aimed at better understanding human behavior and brain health beyond the traditional lab.

Highlights from this year's conference included keynote speakers Hugo Spiers, professor at University College London, and Maryam M. Shanechi, professor at the University of Southern California, as well as the Neurotechnology Panel. Panelists included Dan Adams from Neuralink, Christoph Guger from g.tec Medical Engineering, Katherine Perdue from Kernel, and Brett Wingeier from NeuroPace.



Poster presenter, Isa Shimura from University of Nevada, Reno, explains her research to Yuanyuan Gao, assistant professor at Wichita State University.

Advances in AI: Diagnosis and Treatment of Neurological and Neurodegenerative Disorders Symposium

October 24, 2025

Leading researchers from the Center for Brain Recovery traveled to the San Francisco Bay Area to present their groundbreaking work leveraging artificial intelligence and machine learning tools for detection, treatment, and prediction of neurological and neurodegenerative disorders.

Hosted in collaboration with the Tianqiao and Chrissy Chen Institute, this event gathered Boston University community members, alumni, and parents alongside neurotechnology & healthcare industry professionals and scholars.

Our speakers presented their innovative research applying advances in artificial intelligence to improve our ability to address the complex problem of treating, curing, and preventing brain disorders. Dr. Vijaya B. Kolachalama explored how AI can support neurological workups by improving dementia screening, identifying cognitive impairment, and aiding differential diagnosis through the integration of multimodal patient data. Dr. Theresa Ellis showcased machine learning-powered wearable technologies designed to help individuals with Parkinson's disease overcome freezing of gait and improve mobility. Dr. Risto Miikkulainen presented research on digital twins that can simulate neurological damage and treatment effects, helping predict recovery and disease progression to support more personalized care.

SPEAKERS



Vijaya Kolachalama
Boston University



Theresa Ellis
Boston University



Risto Miikkulainen
The University of Texas
at Austin



Swathi Kiran
Boston University



Dr. Swathi Kiran introduces the symposium.



Dr. Theresa Ellis presents her team's research developing soft robotic apparel to assist walking for individuals with Parkinson's disease who experience freezing of gait.



Attendees network following the presentations.

MedAI Hackathon 2026

April 10–11, 2026

The Center for Brain Recovery sponsored the inaugural MedAI Hackathon, which successfully brought together over 230 registrants across the Boston University community, bridging the Charles River Campus and the Medical Campus. The event marked an exciting achievement for convergent research at BU, as participants collaborated in cross-disciplinary teams to develop AI powered solutions for real-world challenges in healthcare and biomedicine.

On Friday, April 10th, participants formed groups of three to six team members, finding collaborators with diverse skillsets and unique perspectives. Going into the full-day event on April 11th, 30 total teams had been created.

The competition featured three distinct problem sets and challenges to select from, all sourced from research groups across BU.

The three challenges included:

- **Early-stage lung cancer phenotyping**, focusing on predicting microscopic vascular invasion in lung resected tissues and pre-surgical biopsies based on digitized images.
- **Amyloid PET quantification for Alzheimer's disease**, with the goal of predicting Centiloid scores from amyloid PET images across different radiotracers.
- **Acute tubular injury prediction from kidney proteomics data**, aiming to predict the presence or absence of acute tubular injury from blood-based protein abundances and clinical covariates.

“The hackathon demonstrated the power of bringing together students from nearly every corner of BU to solve real biomedical problems through AI.”

— Dr. Vijaya Kolachalama



Participating students work with Hariri Institute team members during the team formation session.



Panelists discuss the key opportunity areas for the application of artificial intelligence in the field of brain health.

Transforming Brain Health and Disease through AI #BosTechWeek

May 29, 2026

AI is rapidly reshaping how we understand, diagnose, and treat the brain at a moment when aging populations are placing unprecedented strain on healthcare systems. To address this shift, Boston University and the BU Center for Brain Recovery hosted an expert panel discussion that convened leaders from academia, healthcare, and industry to explore how AI is driving real progress in brain health from early detection to digital therapeutics and emerging neurotechnology.

Held as part of the first-ever Boston Tech Week, this event brought together over 100 attendees from academia, industry, healthcare, and startups across the Boston area and beyond.

The discussion spanned four core themes: 1) early detection and diagnosis, 2) digital therapeutics and neurotechnology, 3) real-world clinical adoption, and 4) regulation and health equity; each chosen to move the conversation from early promise to practical reality. These themes reflect the full journey of an AI-driven brain health innovation lifecycle. From the research lab and training data, through clinical validation and regulatory approval, and ultimately into the hands of patients and providers.

Given the panel's diverse expertise across academia, hospital systems, startups, and deep learning, the questions were designed to surface productive tension between what the technology can do and what the healthcare system is actually ready to adopt.

Events

10 Key Takeaways

The following 10 key takeaways reflect the insights and perspectives shared by the panelists throughout the discussion.

■ 1. Earlier detection is the biggest area of opportunity

AI is enabling earlier identification of risk for neurological disorders by uncovering patterns in large datasets, with the potential to detect signals before symptoms appear.

■ 2. Bringing science closer to the people

Digital tools and AI-driven technologies are moving brain health assessment and care out of the clinic and into patients' everyday lives, into their hands and their homes.

■ 3. Powerful data requires structuring

The bottleneck isn't the amount of data available, but whether it's properly structured. LLMs are now being used to extract and structure insights buried in clinical notes, unlocking previously untapped information, effectively at the point of care for patients.

■ 4. Cognitive assessment is undergoing a major shift

Traditional in-clinic cognitive testing is being replaced by scalable, digital approaches that capture richer, real-time behavioral data.

■ 5. AI succeeds clinically when it reduces burden

The clearest real-world adoption of AI (e.g., seizure detection in under-resourced hospitals) happened because it replaced a staffing gap, not because it was technically impressive which is a critical lesson for product design.

■ 6. Performance in the lab doesn't guarantee clinical success

AI models that perform well in controlled research settings often struggle to generalize across diverse patients in real-world environments. In testing, these tools need to be exposed to different types of data.

■ 7. Smartphones already know more about brain health than most doctors

Passive signals from devices that range from typing patterns, voice-to-text errors, and speech pauses hold significant diagnostic potential, but we lack the frameworks to extract and clinically validate that data.

■ 8. Clinician trust is critical

Doctors won't use AI tools they can't see inside, so models need to be able to explain reasoning and point to evidence to support claims. Explainability is not a nice-to-have but a prerequisite for adoption in clinical settings.

■ 9. Entrepreneurship in this field requires more than just strong science

In addition to strong technical performance, successful innovation depends on strong product-market fit, human centered design, and building trust with both patients and doctors.

■ 10. The field is moving toward precision brain health

No two human brains are alike, and the panel agreed that AI's ultimate promise is moving medicine away from treating statistical averages toward truly personalized, continuously monitored brain health care.

PANELISTS



Swathi Kiran
Professor, BU; Co-founder,
Constant Therapy



Mylea Charvat
Fractional CMO;
Founder, Savonix



Andy Palmer
Entrepreneur and
Co-Founder, Liza Health



Bernardo Bizzo
Senior Director, Mass
General Brigham AI



Marisa Krummrich
Deep Learning &
Healthcare, MIT



Oliver Armitage
Chief Clinical and
Data Officer, Axoft

INTERESTED IN PARTNERING?

We welcome interest from industry partners, alumni, community organizations, and individuals who would like to engage with or support our work. Please contact us to share your interest in collaboration, partnerships, events, or philanthropic opportunities: bu.edu/cbr/about/partner-with-us/



Achievements & Awards

The CBR team earned various awards and achievements over the course of the past year, including:

FACULTY

Swathi Kiran

- ❖ Chandrasekhar Institute of Speech and Hearing Invited Speaker and Travel Fellow (2025)
- ❖ Best paper Award, Chen Institute Symposium for AI Accelerated Science (2025)

Alice Cronin-Golomb

- ❖ Fellow, American Association for the Advancement of Science (AAAS)
- ❖ Lifetime Award for Research, International Neuropsychological Society

Archana Venkataraman

- ❖ Elected to the IEEE Bio Image and Signal Processing (BISP) Technical Committee

Rafael Romero

- ❖ Elected member of the inaugural BMC Research Excellence Society
- ❖ Rising Star Award, Boston Medical Center, CAPTIVA trial site (Site PI)

Elizabeth Hoover

- ❖ American Speech-Language-Hearing Association (ASHA) Media Champion Award
- ❖ ASHA Research Symposium Mentor

Lou Awad

- ❖ Top 25 Icons and Innovators, Simbex
- ❖ Best Overall Platform Award, Degenerative Disease SIG, APTA Combined Sections Meeting
- ❖ Best Poster Award, Technology in Physical Therapy SIG, APTA Combined Sections Meeting

Terry Ellis

- ❖ Anne Shumway-Cook Lectureship, Academy of Neurologic Physical Therapy

Vijaya Kolachalama

- ❖ Karen Toffler Charitable Trust Investment

STUDENTS AND TRAINEES

Marissa Russell-Meill (Kiran Group)

- ❖ ASHA New Century Doctoral Scholarship

Shalom Henderson (Kiran Group)

- ❖ 2026 Sargent College Internal Grant

Anna Serrichio (Kiran Group)

- ❖ NIDCD Student Fellow, Clinical Aphasiology Conference

Madeline Dunne (Kiran Group)

- ❖ NIDCD Student Fellow, Clinical Aphasiology Conference

Hannah Lee (Kiran Group)

- ❖ 2025 Kimbo Foundation Scholarship
- ❖ Korean American Scholarship Foundation (KASF) Northeastern Regional Chapter Scholarship

Zijian Chen (Venkataraman Lab)

- ❖ ICML Outstanding Reviewer Award

Riya Manchanda (Romero Group)

- ❖ AAN 2025 Abstract Presentation, awarded Student Scholarship

Laura Gutierrez Quiceno (Romero Group)

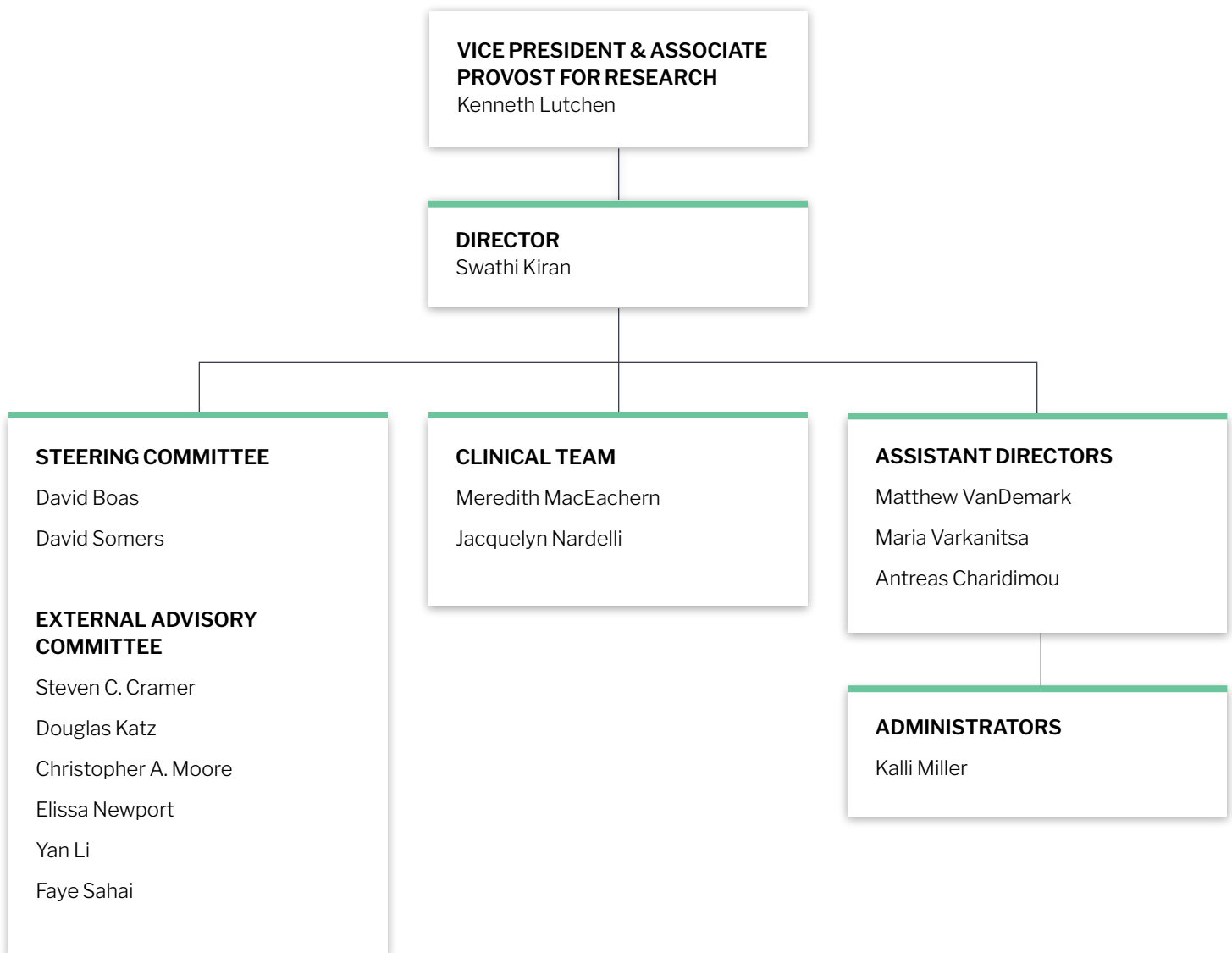
- ❖ Bernard J. Tyson Mentorship Program Awardee, American Heart Association

Courtney Guida (Cronin-Golomb & Esterman Labs)

- ❖ Dean's Dissertation Fellowship, Boston University
- ❖ Clara Mayo Memorial Research Fellowship (\$8,675), Department of Psychological and Brain Sciences, Boston University
- ❖ 50th Anniversary Graduate Student Research Grant (\$5,000), National Academy of Neuropsychology (NAN)



Organizational Chart



Leadership & Staff



Swathi Kiran
Founding Director
Center for Brain Recovery



Matthew VanDemark
Assistant Director, Finance and
Administration



Maria Varkanitsa
Assistant Scientific Director



Antreas Charidimou
Assistant Medical Director



Kalli Miller
Marketing and Events Specialist



Meredith MacEachern
ICCR Clinical Director



Jaquelyn Nardelli
ICCR Supervisor



Erie Shivers
Research Assistant



Emerson Kropp
Research Assistant



Cassie Lee
Research Assistant



Jessica Benson
Research Assistant



Brianna Boadu
Administrative Assistant



Tania Wu
Administrative Assistant

External Advisory Committee



Steven C. Cramer
Professor of Neurology, UCLA



Douglas Katz
Neurology Professor, BUSM



Yan Li
Executive Director of Scientific
Programs, Tianqiao and Chrissy
Chen Institute



Christopher A. Moore
Dean Emeritus,
Boston University



Elissa Newport
Director, Center for Brain
Plasticity and Recovery



Faye Sahai
Managing Director, Vinaj
Ventures

Core Faculty



Stacy Andersen
Associate Professor, Geriatrics



Hugo Aparicio
Associate Professor, NEU



Rhoda Au
Professor, ANAT/NEU



Lou Awad
Assistant Professor, PT



David Boas*
Professor, BME/ECE



Antreas Charidimou
Assistant Professor, NEU



Alice Cronin-Golomb
Professor, PBS



Theresa Ellis
Professor, PT

**Member of the Internal Steering Committee*

Core Faculty



Michael Esterman
Associate Professor, PSY



Elizabeth Hoover
Clinical Professor, SLHS



Prakash Ishwar
Professor, EECS



Swathi Kiran
James and Cecilia Tse Ying
Professor, SLHS



Vijaya Kolachalama
Assistant Professor,
CompBiomed



Rafael Romero
Associate Professor, NEU



David Somers*
Professor, PBS



Michelle Stransky
Research Assistant Professor,
BMC



Yorghos Tripodis
Professor, SPH



Maria Varkanitsa
Research Assistant
Professor, SLHS



Archana Venkataraman
Associate Professor, EECS



Meryem Yücel
Research Associate Professor,
BME

Postdoctoral Scholars



Shalom Henderson
Postdoctoral Associate



Anna Serrichio
Postdoctoral Researcher

**Member of the Internal Steering Committee*

PhD Students



Manuel Marte
PhD Candidate**, SLHS



Michael Scimeca
PhD Candidate**, SLHS



Erin Carpenter
PhD Candidate**, SLHS



Marissa Russell-Meill
PhD Candidate, SLHS



Madeline Dunne
PhD Student, SLHS



Sharon Wang
PhD Student, GMS



Bryson Rorie
PhD Student, GPN



Essiet-Adidiong Ette
PhD Student, GPN

Undergraduate Students

Sukaina Abbas
CAS, Neuroscience

Amelia Andre
CAS, Neuroscience

Mohita Belwariar
SAR, Health Science

Jasmine Bergstrom
CAS, Neuroscience

Helen Blans
CAS, Neuroscience

Venna Rose Boccardi
CAS, Neuroscience

Netersharrura Cook
CAS, Neuroscience

Cindy Frempong
CDS, Data Science

Natalie Hu
Tufts University, Cognitive &
Brain Science

Sia Jeswani
CAS, Neuroscience

Xiaoting Jiang
CAS, Neuroscience

Arpana Kumari
CAS, Neuroscience / Psychology

Chae Eun (Hannah) Lee
SAR, Human Physiology

Chloe Lin
CAS, Neuroscience

Jose Luis De Los Santos
ENG, Biomedical Engineering

Jacie Owens
CAS, Neuroscience

Ashley Palombizio
SAR, Health Science

Emma Schorr
CAS, Neuroscience

Ligia Sibauste
SAR, Speech, Language &
Hearing Sciences

Divya Sivakumar
CAS, Neuroscience

Joshua (Drake) Sullivan
CAS, Neuroscience

Sihyun Sung
CAS, Neuroscience

Maria Valiente
SAR, Human Physiology

María Coro Vizcaino
CAS, Neuroscience

Kan Yanjia
CAS, Computer Science

Isabel Yu
CAS, Neuroscience

***Completed PhD Program in 2025–2026*

Faculty Spotlight

What is your current research focus, and how does it align with the Center for Brain Recovery's mission?

Mike Esterman

Associate Professor,
Psychiatry



“ I study how people stay on task, and how the brain supports goal-directed behavior over time. In everyday life, we constantly juggle competing demands in the face of internal and external distractions. Our ability to sustain focus underlies nearly all complex behavior and real-world functioning, from walking and driving to meeting the demands of work, relationships, and health.

Difficulty with sustained attention is pervasive across brain injury, neurodegeneration, and neuropsychiatric conditions, across the lifespan. My lab uses behavioral paradigms alongside neuroimaging and non-invasive brain stimulation to understand how large-scale brain networks support attention and cognitive control and how we can optimize attention through targeted interventions. This aligns closely with CBR's mission, because disruptions in these processes are common after brain injury and can limit patients' recovery and engagement in treatment.

Stacy Andersen

Associate Professor,
Geriatrics



“ My current research focuses on understanding the factors that contribute to cognitive resilience observed in exceptionally long-lived individuals. Centenarians (people over the age of 100) and their offspring have extended cognitive health spans despite advanced age being a strong risk factor for Alzheimer's disease and related dementias. My work aims to identify the biological, environmental, and behavioral protective factors that underlie this phenomenon with the hope of translating these findings into interventions to help the general population maintain optimal cognitive and brain health throughout life...

Our work aligns with CBR's interdisciplinary approach, combining neuroscience, engineering, and clinical expertise to improve the characterization of cognitive syndromes and early detection and treatment of brain disorders.

Antreas Charidimou

Assistant Professor,
Neurology



Read the full length features on the CBR website:

- [Mike Esterman](#)
- [Stacy Andersen](#)
- [Antreas Charidimou](#)

“ My research focuses on how damage to the brain's small blood vessels contributes to neurological conditions like stroke and dementia. I'm especially interested in cerebral small vessel disease and a related condition called cerebral amyloid angiopathy (CAA), where abnormal protein builds up in these vessels, increasing the risk of brain bleeds and cognitive decline.

This work directly aligns with the Center for Brain Recovery's mission to bring together experts across disciplines to tackle complex brain disorders and brain health. My research bridges clinical care and imaging-based science to improve how we diagnose and treat these diseases. Importantly, it also supports CBR's broader goals around brain health by exploring how small vessel disease affects both overall cognition and specific outcomes in conditions like aphasia. Through this work, we aim to better understand who is at risk, how to intervene earlier, and how to support recovery more effectively.

Faculty Collaborations

- Alosco, M. L., Morrison, M., **Au, R.**, Steinberg, E. G., Mwicigi, J., Ly, M., Altaras, C., Lenio, S., Abdennadher, M., O'Connor, M. K., **Tripodis, Y.**, Palmisano, J., Dixon, D., Martin, B., Schneider, G., Groh, J. R., Ellison, A., Sheppard, D., Farris, C. W., Nowinski, C., ... Mez, J. (2025). Boston University Alzheimer's Disease Research Center Clinical Core: Infrastructure to facilitate research on post-traumatic Alzheimer's disease and related dementias. *Alzheimer's & dementia: the journal of the Alzheimer's Association*, 21(9), e70654. <https://doi.org/10.1002/alz.70654>
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Faculty Publications

CBR FACULTY PUBLISHED THE FOLLOWING SELECTED ARTICLES. Articles published by two or more Center-affiliated faculty are indicated by * (an asterisk).

- Aaronson, A., Badlam, G., Mulayi, S. C., Tuz-Zahra, F., Goostrey, K. J., **Tripodis, Y.**, Cole-French, W. S., Roebuck, M., Schneider, G., Pine, B. N., Palmisano, J. N., Martin, B. M., Zavitz, K. H., Katz, D. I., Nowinski, C. J., McKee, A. C., Stein, T. D., Mackin, R. S., McClean, M. D., ... Alosco, M. L. (2026). Cognitive and Neuropsychiatric Function in Former American Football Players. *JAMA Network Open*, 9(2), e2560077–e2560077. <https://doi.org/10.1001/jamanetworkopen.2025.60077>
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- *Araujo-Contreras, R., Pinheiro, A. A., Ekenze, O., Sisto, J., **Aparicio, H. J.**, Beiser, A., Himali, J. J., Lioutas, V., DeCarli, C., Seshadri, S., Demissie, S., & **Romero, J. R.** (2025). Multi-marker cerebral small vessel disease score and risk of incident depression: The Framingham Heart Study. *Journal of Affective Disorders*, 120089. <https://doi.org/10.1016/J.JAD.2025.120089>
- ***Au, R.**, Bose, N., Imam, F., & **Kolachalama, V. B.** (2025). Technological advances enabling an enhanced understanding of early Alzheimer's disease. *Alzheimer's & Dementia*, 21(11), e70883. <https://doi.org/10.1002/ALZ.70883>
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Faculty Publications

Neuroscience, Advance Publication.
<https://doi.org/10.1162/IMAG.a.971>

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Boston University Center for Brain Recovery

111 Cummington Mall, Suite 280
Boston, MA 02215

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