2020 | ANNUAL REPORT

UCI MIND

Institute for Memory Impairments and Neurological Disorders

LETTER FROM THE DIRECTOR

DEAR FRIENDS OF UCI MIND

2025 was a year unlike any other. At UCI MIND, we achieved some key and some unexpected milestones. At UCI and beyond, it was another year of great progress in the fight against Alzheimer's disease and related disorders (ADRD). This end-of-year report overviews UCI MIND's role in that progress, as well as highilights from 2025 in our training and community education missions.

The first few pages of the report are committed to very large milestones. In 2025, a team of UCI MIND investigators successfully renewed the grant from the National Institutes of Health (more specifically the National Institute on Aging, NIA) that funds our Alzheimer's Disease Research Center (ADRC). This brings the UCI ADRC to more than 40 years of continuous funding as a national center of excellence. This report outlines the unique structure of our ADRC, composed of cores and led by teams of renowned investigators.

An even more momentous milestone came in October, when a $50M donation from Ann and Charlie, Chris, Matt and Patty, and Patrick Quilter was announced. This is the largest philanthropic gift in UCI MIND's history and among the largest for the campus. The Quilter family was joined by other amazing supporters of UCI MIND. Mike Hayde and Laura Khouri, Harriet Harris, the Brethren Community Foundation, and Keith Swayne all made 7-figure commitments toward a campaign that will build a new home for UCI MIND on campus. ***Ann Hutchinson Quilter Hall*** will be so named because of the incredible generosity of the Quilter Family and will position UCI MIND to accelerate and amplify its mission like never before.

Philanthropy remains vital to our success. We use it to recruit new faculty, fund innovative and impactful research, and to support and train the next generation of leaders in research and care for older adults with neurodegenerative disorders. This report includes exciting progress in each of these arms of our mission and each of them is possible because of the unwavering support of our community.

Sincerely,

Joshua Grill, PhD

Professor of Psychiatry & Human Behavior and Neurobiology & Behavior

Carla Liggett and Arthur S. Liggett, MD, Endowed Chair, in honor of Frank M. LaFerla

Co-Director, Alzheimer's Disease Research Center

Director, Institute for Memory Impairments and Neurological Disorders

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ⓘ Indicates additional details available

UCI MIND RECEIVES RENEWED DESIGNATION AS NIH CENTER OF EXCELLENCE

* **DMS** Data Management and Statistical | **ORE** Outreach, Recruitment & Engagement | **iPSC** Induced Pluripotent Stem Cell | **REC** Research Education Component

In July, UCI MIND was awarded renewal of its P30 Alzheimer's Disease Research Center grant from the National Institute on Aging, one of the National Institutes of Health.

The 5-year, $21 million grant will continue to provide funding for groundbreaking Alzheimer's disease and related dementia (ADRD) research and training at UC Irvine. The grant will also support educational activities to help strengthen brain health literacy in the local community.

- Only federally designated AD research center of its kind in Orange County
- One of the first 5 centers funded by NIA in 1984
- Carl Cotman was the founding director

The ADRC is a key and central element of UCI MIND. Most other projects radiate out from this highly competitive center program.

The ADRC consists of 9 cores and a component including the network's first pluripotent stem cell core and special cores focused on the oldest-old and people with Down syndrome. In addition, our ADRC houses a Research Education Component.

Pages 9 - 13 detail the contribution of each core to the mission of the ADRC.

EXCITING NEW BEGINNINGS ARE ON THE HORIZON FOR UCI MIND

Thanks to the Quilter Family

We are thrilled to announce that, thanks to the generosity and unwavering support of Ann and Charlie Quilter and their family, UCI MIND has officially launched a building campaign to establish a new comprehensive, permanent home for the Institute.

Ann Quilter has been a part of the UCI MIND family for over a decade. Her journey with us began from a deeply personal place—after witnessing her mother's decline from Alzheimer's disease and her father's struggle with Lewy body dementia. Her belief in our mission has been steadfast. Not only is she an active participant in our longitudinal study, but she has also been one of our most passionate and dedicated advocates.

A major turning point in UCI MIND's future came in the fall of 2024, following the successful sale of QSC Audio (formerly QSC, LLC), Ann's brother-in-law Patrick's sound technology company. Ann immediately reached out with a transformative decision—she and Charlie would make a $5 million unrestricted gift to support the work of UCI MIND. That became the lead gift in a silent campaign to build UCI MIND a new home. This remarkable act of generosity was the beginning of a deepening relationship with the entire Quilter family.

The Quilter family's support quickly expanded beyond Ann and Charlie to include the Quilter brothers—Patrick, Chris, and Matt—all without Ann's knowledge. Their collective commitment to each other and to our mission has resulted in a transformation that will profoundly alter the future of UCI MIND.

In December of 2024, shortly after the UCI MIND Gala, Chris Quilter generously decided to match Ann and Charlie's initial gift—bringing an unlaunched campaign to a total $10 million. Chris also made a critical inquiry—what would it take for the campus to name the building in Ann's honor? The answer was delivered in April of 2025 to Ann's brother-in-law Patrick. Equally motivated to honor his sister-in-law, Patrick made a bold and generous gift—that quickly brought the Quilter family's support to an astonishing $50 million milestone.

What we at UCI MIND had envisioned as a multi-year campaign was suddenly off to an accelerated start, thanks to the deeply invested and passionate support of one family.

We are profoundly grateful to the Quilters—not only for their generosity but for the spirit of collaboration, trust, and shared vision they have brought to their partnership with UCI MIND. This is more than a gift; it is a legacy of hope for countless families affected by Alzheimer's and other dementias.

And this is just the beginning.

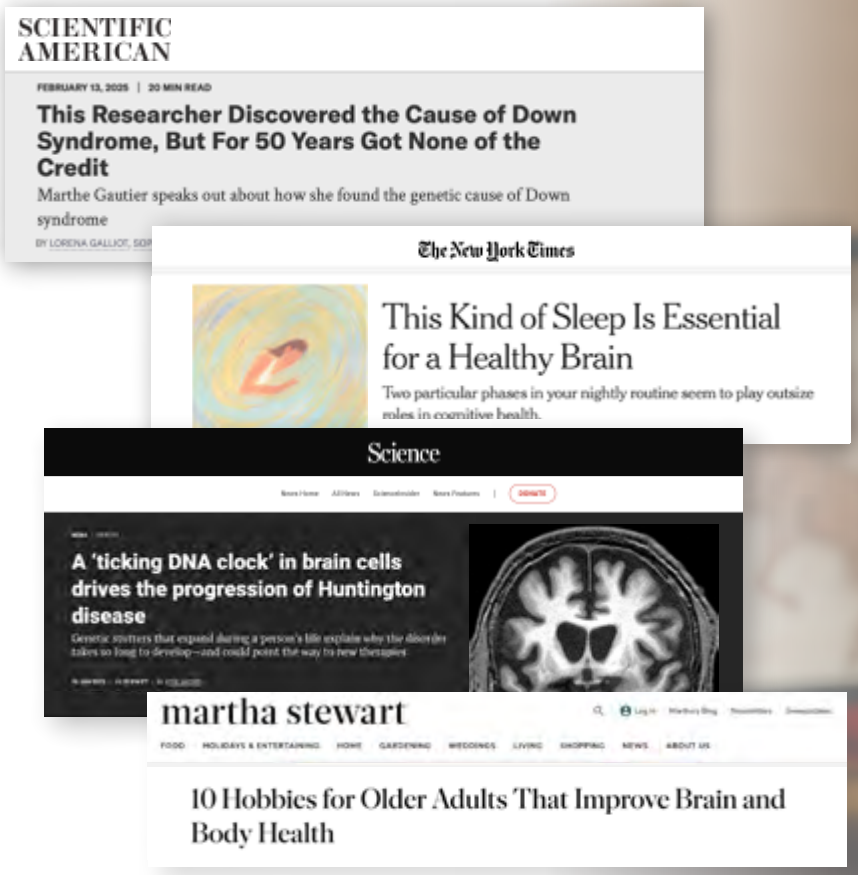
INSTITUTE FACTS:

41 Years as an ADRC

76 Faculty Members from **26 departments**

89 Staff Members

>90 publications in 2025



UCI MIND investigators are frequently quoted as **experts** in the popular media.

This year, **Aileen Anderson, PhD**, professor of physical medicine and rehabilitation, anatomy and neurobiology, and neurosurgery, and a UCI MIND faculty member was named Vice Chancellor for Research (VCR) at UC Irvine. She earned her PhD in the laboratory of Carl Cotman, the founding director of UCI MIND.

In her role as VCR, she **oversees the campus's more than half-a-billion-dollar research portfolio**, as well as its extensive network of organized research units and centers. Her research focuses on inflammatory mechanisms underlying degeneration and regeneration in the injured central nervous system, with an emphasis on stem cell–based approaches.

FACULTY

Anatomy & Neurobiology
Aileen Anderson, PhD
Tallie Baram, MD, PhD
Christine Gall, PhD, Chair
Alan Goldin, MD, PhD
Kei Igarashi, PhD
Gary Lynch, PhD
Steven Schreiber, MD
John Weiss, MD, PhD
Xiangmin Xu, PhD

Biological Chemistry
Wei Li, PhD

Biomedical Engineering
Gregory Brewer, PhD

Chemistry
James Nowick, PhD
Xiaoyu Shi, PhD

Clinical Pharmacy Practice
Atena Zahedi, PhD

Developmental & Cell Biology
Grant MacGregor, DPhil
Edwin Monuki, MD, PhD
Ali Mortazavi, PhD
Diane O'Dowd, PhD
Xiaoyu Shi, PhD

Electrical Engineering & Computer Science
Fei Xia, PhD

Environmental & Occupational Health
Masashi Kitazawa, PhD
Karen Lincoln, PhD, MSW, MA, FGSA

Epidemiology
Maria Corrada, ScD
Daniel Gillen, PhD
Sunmin Lee, ScD

Health, Society, & Behavior
Leigh Turner, PhD

Medicine
Masashi Kitazawa, PhD
Steven Tam, MD

Microbiology & Molecular Genetics
Emiliana Borrelli, PhD
Alan Goldin, MD, PhD

Molecular Biology & Biochemistry
Charles Glabe, PhD
Andrea Tenner, PhD

Neurobiology & Behavior
Mathew Blurton-Jones, PhD
Jorge Busciglio, PhD
Christine Gall, PhD
Kim Green, PhD
Joshua Grill, PhD
Frank LaFerla, PhD, Dean
Michael Leon, PhD
Craig Stark, PhD
Vivek Swarup, PhD
Leslie Thompson, PhD
Marcelo Wood, PhD, Chair
Michael Yassa, PhD

Neurological Surgery
Jefferson Chen, MD

Neurology
Tallie Baram, MD, PhD
Maria Corrada, ScD
David Cribbs, PhD
Ali Ezzati, MD
Mark Fisher, MD
Lisa Flanagan, PhD
Crystal M. Glover, PhD
Claire Henchcliffe, MD, DPhil, Chair
Brian Hitt, MD, PhD
Albert La Spada, MD, PhD
Ira Lott, MD
Mark Mapstone, PhD
Tahseen Mozaffar, MD
S. Ahmad Sajjadi, MD, PhD
Steven Schreiber, MD
Gaby Thai, MD
John Weiss, MD, PhD
Michael Yassa, PhD

Nursing
Michael Bueno, PhD, MSN, RN, CNL
Sarah Campbell, DNP, MS, BS, AS
Jung-Ah Lee, PhD, RN, FGSA, FAAN
Adey M. Nyamathi, ANP, PhD, FAAN
Nancy Pike, PhD, FNP-BC, CPNP-AC/PC, FAHA, FAAN, Associate Dean, Research

Otolaryngology
Medhi Abouzari, MD, PhD

Pathology & Laboratory Medicine
Elizabeth Head, PhD, Vice Chair
Albert La Spada, MD, PhD
Edwin Monuki, MD, PhD, Chair
Mari Perez-Rosendahl, MD
William Yong, MD

Pediatrics
Tallie Baram, MD, PhD
Virginia Kimonis, MD
Ira Lott, MD

Pharmaceutical Sciences
Emiliana Borrelli, PhD

Physical Medicine & Rehabilitation
Aileen Anderson, PhD
Brian Cummings, PhD

Physiology & Biophysics
Kevin Beier, PhD
Alan Goldin, MD, PhD

Psychiatry & Human Behavior
Lydia Ann, MD
Cameron Carter, MD, Chair
Joshua Grill, PhD
Christy Hom, PhD
Gary Lynch, PhD
Bryce Mander, PhD
Joan Steffan, PhD
David Sultzer, MD
Leslie Thompson, PhD
Michael Yassa, PhD

Radiation Oncology
Charles Limoli, PhD

Statistics
Daniel Gillen, PhD, Chair
Bin Nan, PhD

OUR NEW FACULTY reflect the wide breadth of work we are exploring

Mehdi Abouzari, MD, PhD

Assistant Professor of Otolaryngology and Director of Clinical Research of Otology and Neurotology

Dr. Abouzari is a translational physician-scientist who bridges clinical practice with cutting-edge research to advance the understanding and treatment of ear and hearing disorders. In addition to his clinical and research roles, Dr. Abouzari serves as an Associate Fellow of the American Neurotology Society, Associate Editor of Frontiers in Audiology and Otology, and Editorial Board member of Research in Vestibular Science. These positions reflect his expertise and leadership in advancing the field of otolaryngology. As Director of the ENTelligence Lab, Dr. Abouzari pioneers the application of artificial intelligence and machine learning in otolaryngology and hearing sciences. His innovative approach combines traditional clinical expertise with advanced computational methods to develop new diagnostic and therapeutic solutions for patients with ear, nose, and throat conditions. Through this work, he is helping to shape the future of precision medicine in otolaryngology.

Jefferson W. Chen, MD, PhD

Clinical Professor and Acting Chair of Neurological Surgery

A board-certified neurosurgeon, Dr. Chen specializes in neurological trauma and critical care, normal pressure hydrocephalus, stroke, and brain tumors. He also serves as Director of the CAST Neurocritical Care Fellowship and Director of Neurotrauma. A recognized leader in advanced neurosurgical techniques, Dr. Chen pioneered the use of multimodal brain monitoring for traumatic brain injury and BrainPath® technology for accessing deep-seated brain lesions. His active research focuses on the molecular mechanisms of traumatic brain injury and stroke, as well as cerebrospinal fluid dynamics. Dr. Chen's excellence has been recognized through numerous awards, including the 2020 Orange County Physician of Excellence and multiple ARIISE Awards for Innovation at UC Irvine. He has been consistently listed among "Best Doctors in America" and holds fellowship status in the American College of Critical Care Medicine.

Crystal M. Glover, PhD

Associate Professor of Neurology

Dr. Glover leads the Outreach, Recruitment, and Engagement Core at the UCI Alzheimer's Disease Research Center at UCI MIND. She also serves as an Associate Director of the Recruitment, Engagement, and Retention Unit in the Alzheimer's Clinical Trials Consortium (ACTC) and she is the inaugural Editor-in-Chief of Alzheimer's & Dementia: Behavior & Socioeconomics of Aging (BSEA). Dr. Glover is an applied social psychologist and mixed methodologist, who has designed and built a program of research focused on addressing challenges related to health and research access and facilitating optimal outcomes in aging. Her program of research consists of two interconnected components that examine: 1) decision making associated with complex, nuanced, and sensitive topics in older age; and 2) protective and risk factors of healthy aging. Her research has led to the design, development, and implementation of engagement approaches, educational materials, and intervention strategies.

Christy L. Hom, PhD

Associate Clinical Professor of Psychiatry & Human Behavior

Dr. Hom is a board-certified UCI Health neuropsychologist and forensic psychologist, she serves as Director of Training for the UCI Health Lifespan Neuropsychology practicum and leads groundbreaking research in Down syndrome and Alzheimer's disease. As a leading researcher in Down syndrome and cognitive development, Dr. Hom serves as MPI/site PI of multiple NIH-funded studies, including the Metabolic Health, Lifestyle, and Risk of Co-occurring Health Conditions in Down Syndrome (MET-DS) study, the Alzheimer's Disease Biomarkers Consortium in Down Syndrome (ABC-DS), and the Lifestyle and Alzheimer's Disease in Down Syndrome study. She is also a co-investigator of the ADRC Down Syndrome Core, contributing vital research on cognitive reserve and Alzheimer's disease risk in individuals with intellectual disabilities. Dr. Hom's clinical expertise encompasses the assessment and treatment of autism spectrum disorder, intellectual disabilities, learning disabilities, ADHD, and other neurological conditions. She has authored numerous peer-reviewed publications and is recognized for her innovative work in cognitive assessment tools and early detection of dementia in Down syndrome populations.

OUR NEW FACULTY

Grant MacGregor, DPhil

Professor of Developmental & Cell Biology

Dr. MacGregor's research focuses on three major areas: investigating the novel FNDC3 protein family's roles in reproduction and development, developing improved mouse models for late-onset Alzheimer's disease through the NIA/NIH-funded MODEL-AD consortium, and studying genetic variation's impact on gene expression through collaboration with Caltech. His work on FNDC3 proteins has revealed their involvement in bone fragility, infertility, cardiac development, liver disease, and cancer metastasis—conditions with significant human health impact. Since 1993, his laboratory has investigated mammalian reproduction and development using mouse models, contributing to our understanding of germline development, skeletogenesis, programmed cell death, and mitochondrial biology. Dr. MacGregor is committed to open science through MODEL-AD, making research data and mouse models freely available to accelerate Alzheimer's disease research. A dedicated educator, he has received numerous teaching honors, including the 2018 Dr. De Gallow Professor of the Year award and the 2004 UCI Chancellor's Award for Excellence in Fostering Undergraduate Research.

Nancy Pike, PhD, RN, CPNP-AC/PC, FAHA, FAAN

Professor and Associate Dean for Research,
Sue & Bill Gross School of Nursing

As a pioneering researcher in pediatric congenital heart disease, Dr. Pike leads an innovative biobehavioral and neuroimaging research program funded by multiple NIH grants. Her work focuses on structural brain injury, cerebral blood flow, and cognitive and psychosocial outcomes in adolescents and young adults with congenital heart disease, particularly single ventricle heart disease. She was the first to develop and validate computer-based cognitive interventions to improve working memory and attention in this vulnerable population, and her research has directly influenced clinical practice standards for cognitive screening across the lifespan. Dr. Pike's exceptional contributions have earned her numerous prestigious honors, including induction into the STTI International Nursing Researcher Hall of Fame in 2022, Fellowship in the American Academy of Nursing 2013, and Fellowship in the American Heart Association Council of Cardiovascular Nursing 2005. Recent recognitions include the 2024 Western Institute of Nursing Anna M. Shannon Mentorship Award and serving as the 2023 Florence Nightingale Invited Speaker for the Association for European Pediatric Cardiology.

Fei Xia, PhD

Assistant Professor of Electrical Engineering
and Computer Science

Dr. Xia leads a dynamic research team focused on designing cutting-edge optical systems to image, sense, and process biomedical information through light-based technologies. Her work aims to develop the next generation of optical microscopy by integrating advances in hardware, physical simulations, and computational approaches. Her laboratory strives to enhance imaging precision across spatiotemporal dimensions, seeking to unlock deeper, faster, and more informative insights into the complex processes that govern brain function. Dr. Xia's exceptional contributions have earned her numerous prestigious recognitions, including the 2024 Rising Star in Light award, 2023 Optica Foundation Challenge Award, 2022 Seal of Excellence for Marie Skłodowska-Curie Fellowship, 2022 SPIE Women in Optics recognition, 2020 Data Open Championship, and the 2019 Mong NeuroTech Fellowship.

Atena Zahedi, PhD

Assistant Professor of Clinical Pharmacy Practice

Dr. Zahedi is a distinguished bioengineering researcher specializing in mitochondrial dysfunction and stem cell therapeutics. Her work utilizes human iPSC-based models and transgenic animals to explore mitochondria-targeted therapies that mitigate inflammation and tissue damage. Her research offers promising avenues for novel treatments aimed at improving quality of life for individuals affected by debilitating neurodegenerative and inflammatory conditions. Dr. Zahedi has been recognized with several prestigious fellowships, including the UC President's Postdoctoral Fellowship—a university-wide honor recognizing exceptional research potential—and the KL-2 Faculty Mentored Fellowship at UC Irvine's Institute for Clinical and Translational Science. During her postdoctoral work, she leveraged mitochondrial-targeted therapeutics to enhance the efficacy of stem cell transplantation in spinal cord injury models.

ADMINISTRATIVE CORE

Frank LaFerla, PhD
Center Co-Director and Dr. Lionel and Fay Ng Dean of the UC Irvine Charlie Dunlop School of Biological Sciences

Joshua Grill, PhD
Center Co-Director and Director, Institute for Memory Impairments and Neurological Disorders

The Administrative Core serves as the strategic lead and operational backbone of the ADRC, providing essential support that enables the organization to function effectively.

Provides: Strategic Planning, Grant management, Accounting, Human relations, Development

- **Active Grants: 46 totaling > $139M**
- **5 New grants** awarded this year totaling $39M
- Staff members: **89 active appointments** consisting of student workers, professional, technical, administrative and clerical personnel

CLINICAL CORE

The Clinical Core manages the ADRC's substantial clinical research program including our Longitudinal Cohort and clinical trials. Specimens and data generated from these studies are used to support several other Cores.

Participants enrolled in the Longitudinal Cohort have annual assessments with cognitive testing, physical and neurological exams, and a study interview. The purpose:

- To understand the differences between dementia and normal aging
- To identify the earliest changes in people at risk of dementia

All de-identified data is provided to a national repository and along with data from the other ADRC's, is shared with researchers around the world.

- **389 people** are currently engaged in clinical research
- **82% of enrollees** have agreed to brain donation

S. Ahmad Sajjadi, MD, PhD
Clinical Core Leader and Associate Professor of Neurology

David Sultzer, MD
Clinical Core Leader and Professor of Psychiatry and Human Behavior

Daniel Gillen, PhD
DMS Core Leader and Professor and Chair of Statistics

DATA MANAGEMENT AND STATISTICAL CORE

The Data Management and Statistical (DMS) Core serves as the central data and informational hub for the ADRC, responsible for securely housing, maintaining, and managing the comprehensive datasets generated across all center activities. Beyond data stewardship, the DMS Core provides innovative design support and statistical expertise to advance research studies within the ADRC.

Additionally, the DMS Core facilitates strategic data sharing initiatives, ensuring that valuable research datasets are accessible to the broader scientific community while maintaining the highest standards of data security and participant privacy.

This year, the DMS Core published 8 articles in collaboration with the Clinical and ORE Cores; most were related to clinical trial design.

NEUROPATHOLOGY CORE

The Neuropathology Core is responsible for the collection, storage, analysis and distribution of postmortem tissue from participants enrolled in clinical research.

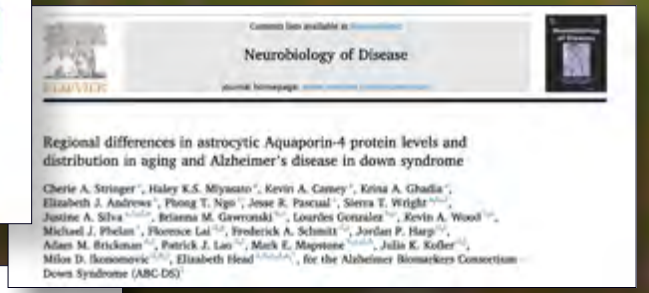
Brain autopsy allows scientists to confirm the final definitive etiological diagnosis.

Edwin Monuki, MD, PhD
Neuropathology Core Leader and Warren L. Bostick Professor and Chair of Pathology & Laboratory Medicine. He is a leading expert in the study of the choroidplexus, a region of the brain responsible for producing cerebrospinal fluid and associated with changes during AD.

- **1,630 Brains collected at UCI**
- **116 unique institutions** received tissue since 2024
- **Supported 41 publications**, and **64 grants**

These selected high-impact publications provide a snapshot of faculty research advanced by ADRC Neuropathology Core tissue.


BRAIN
ORIGINAL ARTICLE
Common neuropathologic change drivers of hippocampal sclerosis of ageing


Neurobiology of Disease
Regional differences in astrocytic Aquaporin-4 protein levels and distribution in aging and Alzheimer's disease in down syndrome


Neurology
RESEARCH ARTICLE
Association of Subjective Memory Complaints With Neuropathologic Changes at Age 90 or Older
The 90+ Study


scientific reports
OPEN
Analysis of changes in intercellular communications in Alzheimer's disease reveals conserved changes in glutamatergic transmission in mice and humans

OUTREACH, RECRUITMENT AND ENGAGEMENT CORE

The Outreach, Recruitment and Engagement (ORE) Core fulfills dual critical functions for the ADRC. As the primary recruitment hub, it identifies and enrolls participants for clinical studies, while simultaneously serving as our public education gateway, disseminating the latest advances in ADRD research and clinical care. Through these complementary roles, the ORE Core serves the broader community.

- **>20** Community Partners
- **152** Outreach Events in 2025
- **61** Blogposts
- **7,230** Social Media followers
- **5,191** Email Subscribers

Crystal M. Glover, PhD, Associate Professor of Neurology, is the ORE Core Leader, having been recruited last year from the ADRC at Rush University.

INDUCED PLURIPOTENT STEM CELL CORE

Mathew Blurton-Jones, PhD
iPSC Core Leader and Professor of Neurobiology and Behavior

The Induced Pluripotent Stem Cell (iPSC) Core leverages human cellular models to enable scientists to conduct in-depth investigations into the underlying mechanisms, pathophysiology, and potential therapeutic targets of ADRD.

Through close collaboration with the Clinical Core, the iPSC Core systematically collects blood and skin specimens from participants enrolled in our longitudinal studies. These biological samples undergo sophisticated reprogramming, transforming them into pluripotent stem cells capable of differentiating into any cell type in the body—including the neurons and glial cells that are central to understanding neurodegeneration.

Using stem cell lines derived from the UC Irvine iPSC Core, the Blurton-Jones Lab engineered microglia capable of delivering therapeutic peptides from within the brain. In an article published in *Cell Stem Cell* this year, iPSC-derived microglia were CRISPR-modified to secrete the amyloid degrading enzyme, neprilysin. Following transplantation into their AD-mouse model, these engineered cells reduced amyloid levels and prevented synaptic loss and neuroinflammation.

This study demonstrates the potential for stem cell derived microglia, like those derived from the iPSC Core, to be therapeutically deployed as cell based therapies for neurological disorders.

BIOMARKER CORE

Craig Stark, PhD
Biomarker Core Leader, Facility for Imaging and Brain Research (FIBRE) Director, and Professor of Neurobiology and Behavior

The Biomarker Core collects, processes and analyzes diverse imaging and biological specimens from clinical research participants, generating high-quality biomarker data to support translational research initiatives.

ADRC participants contribute the following for biomarker analysis:

- Blood/Plasma
- Cerebrospinal fluid
- Neuroimaging
- Cognitive tests

UCI MIND has successfully launched the CLARiTI Study, a groundbreaking ADRC network-wide imaging biomarker initiative from the University of Wisconsin. Enrolled ADRC participants will undergo amyloid and tau PET imaging. The resulting data will be made accessible to researchers worldwide, advancing global Alzheimer's disease research efforts.

DOWN SYNDROME CORE

People with Down syndrome are at significantly higher risk of developing Alzheimer's disease and UCI MIND is the only ADRC with a dedicated Down Syndrome Core.

The Down Syndrome (DS) Core seeks to elucidate the causes, biological framework, and clinical manifestations of Alzheimer's disease in people with Down syndrome. The Core's work instructs efforts to identify potential treatments for this unique and important population.

Ira Lott, MD, Professor emeritus of Pediatrics and **Elizabeth Head, PhD**, Professor of Pathology and Laboratory Medicine, lead the DS Core. Both are world-renowned experts in the study of Alzheimer's disease in people with Down syndrome.

The DS Core enrolls people with Down syndrome 18 years and older into a longitudinal cohort study. Clinical, cognitive, fluid to biospecimen and imaging data are collected and analyzed. Many participants have also donated their brain after death, creating one of the most robust and unique resources in the world for this area of research.

This year, in collaboration with colleagues from the University of Kansas, the DS Core published an important article in *Alzheimer's & Dementia* describing the establishment and progress of the two respective ADRCs in building research programs to study people with Down syndrome.

OLDEST-OLD CORE

The Oldest-Old Core aims to better understand the aging brain in people 85 years and older, who are the fastest growing and among the most understudied segment of the population.

The Core is led by **María Corrada, ScD**, Professor of Neurology and Epidemiology & Biostatistics and builds on the landmark The 90+ Study, established by Dr. Corrada and recently retired Dr. Claudia Kawas.

The Core conducts critical research to understand and instruct assessments of cognitive impairment in this population. The Oldest-Old Core will emphasize assessments of individuals age 85 or older in the Clinical Core and synergize with the recently funded TRC-LATE program (page 16), which Dr. Corrada is a key co-investigator.

RESEARCH AND EDUCATION COMPONENT

The Research and Education Component (REC) functions as the training cornerstone of the ADRC, providing essential mentorship and professional development opportunities to cultivate future leaders in ADRD research.

Since 2020, there have been 11 REC trainees.

Xiaoyu Shi, PhD, an associate professor of Developmental and Cell Biology, and a REC Scholar, was awarded the 2025 National Alzheimer's Coordinating Center REC Rising Star Award. Dr. Shi applies state of the art microscopy techniques to study cellular function and spatial organization in aging and the development of disease.

Kevin Beier, PhD, an associate professor of Physiology and Biophysics and a past REC scholar, has been awarded $200,000 through the Alzheimer's Association's International Research Grant Program for his project "The role of the retrosplenial cortex in mouse and human Alzheimer's disease." Dr. Beier's lab uses retroviruses to map neural circuits and study addiction, mood disorders, and neurodegenerative diseases. His research focuses on the retrosplenial cortex as a potential early driver of Alzheimer's disease.

"We've found in mouse models that hyperactivity in the retrosplenial cortex causally contributes to Alzheimer's progression," explains Dr. Beier. "We're now testing whether similar changes occur in humans and can be detected early in the disease." The research has particular relevance for people with Down syndrome, who are genetically predisposed to develop Alzheimer's-related brain changes. The team is investigating whether similar molecular changes occur in brain tissue from Down syndrome donors.

Leader of the REC:
Elizabeth Head, PhD
Professor, Vice Chair for Research, Pathology and Laboratory Medicine, Director, Experimental Pathology Program

RESEARCH UPDATE

Each year, UCI MIND scientists contribute groundbreaking discoveries that deepen our understanding of Alzheimer's disease and related dementias. From decoding the molecular pathways that drive neurodegeneration to developing more accessible diagnostic tools, these studies exemplify the innovation and collaboration that define our research community.

2025 was another highly productive year for UCI MIND investigators, who published several high-impact papers across leading journals. The following highlights showcase how UCI MIND researchers are illuminating the biological and clinical foundations of Alzheimer's disease and paving the way toward earlier detection and more effective treatment strategies.

AI generated impression of spatial transcriptomics in the human brain, where molecular signals form a luminous map linking cellular architecture to gene expression.

Vivek Swarup, PhD
Associate Professor,
Neurobiology and Behavior
Charlie Dunlop School of
Biological Sciences

MAPPING HOW ALZHEIMER'S DIFFERS ACROSS THE BRAIN

Spatial and single-nucleus transcriptomic analysis of genetic and sporadic forms of Alzheimer's disease

Emily Miyoshi, PhD – Swarup Lab

Published in *Nature Genetics*, November 2024

- Used advanced molecular tools to study how Alzheimer's disease affects individual brain cells
- Compared brain tissue from people with typical Alzheimer's and those with Down syndrome
- Identified shared and distinct molecular pathways driving disease in each group
- Findings may help explain why Alzheimer's progresses differently across individuals and support more personalized treatment approaches

Immune cells (red) entering the brain through a newly identified pathway called the velum interpositum (blue).

A NEW PATHWAY FOR IMMUNE CELLS TO ENTER THE BRAIN

Identification of the velum interpositum as a meningeal-CNS route for myeloid cell trafficking into the brain

Lindsay Hohsfield, PhD – Green Lab

Published in *Neuron*, August 2025

- Discovered a previously unknown structure, the velum interpositum, that allows immune cells to enter the brain
- Redefines how scientists understand the connection between the brain and the immune system
- Provides new insight into how inflammation may develop in Alzheimer's disease

HOW MOLECULAR CHANGES DISRUPT MEMORY

Cationic peptides cause memory loss through endophilin-mediated endocytosis

Kevin Beier, PhD, Associate Professor, Physiology & Biophysics

Published in *Nature*, January 2025

- Found that small, positively charged molecules, cationic peptides, can interfere with brain cell communication
- Peptides trigger the removal of key receptors needed for memory storage
- Blocking this process in lab models helped prevent memory loss after brain injury
- Offers new understanding of how memories are formed, stored, and protected

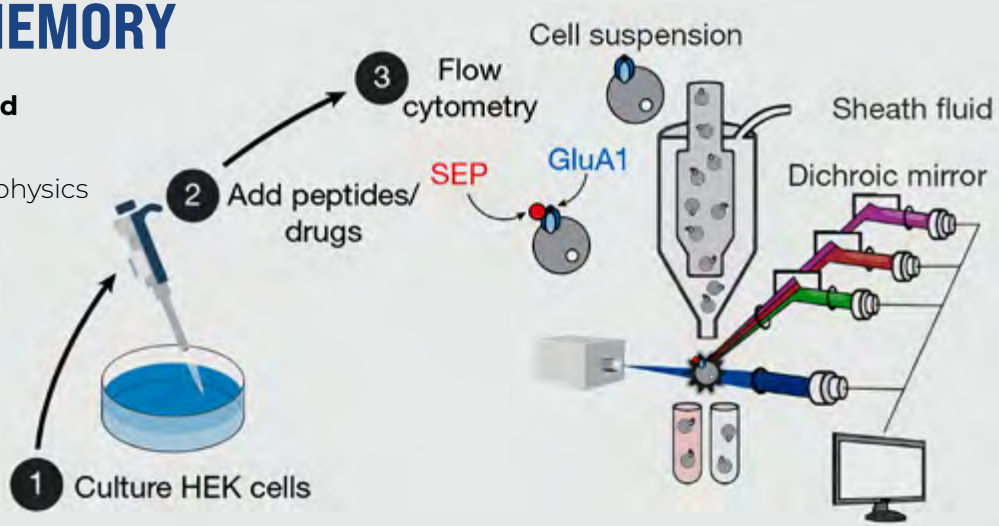
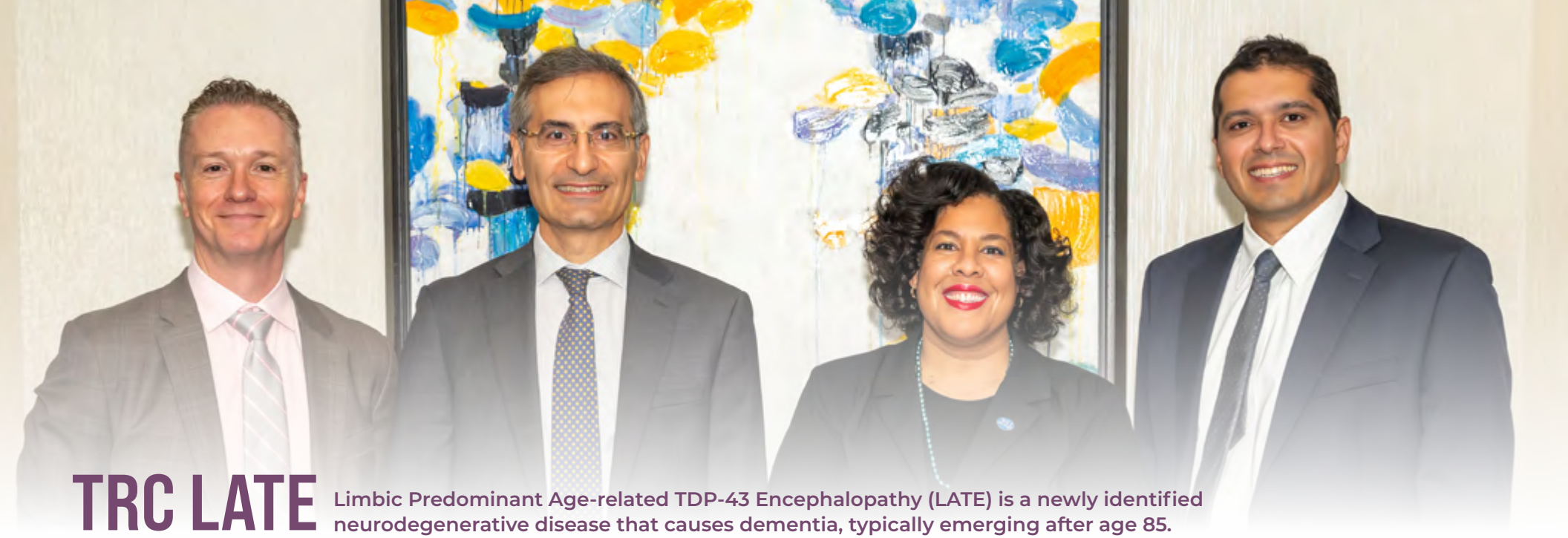


Illustration of how researchers tested how small molecules affect brain cell function. Peptides and drugs were added to cultured cells, and specialized imaging techniques were used to measure how these treatments changed cell activity.

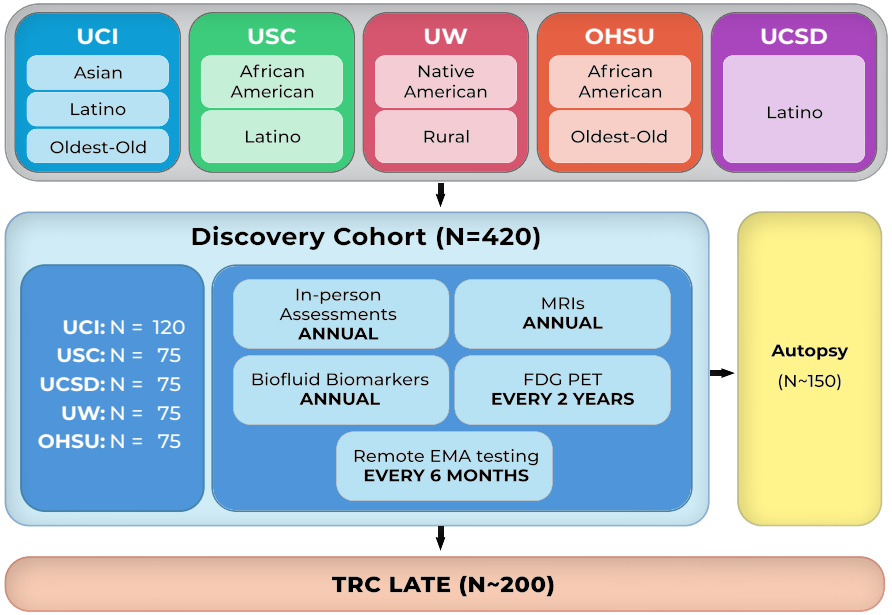


TRC LATE

Limbic Predominant Age-related TDP-43 Encephalopathy (LATE) is a newly identified neurodegenerative disease that causes dementia, typically emerging after age 85.

S. Ahmad Sajjadi, MD, PhD (second from left), an associate professor of Neurology and expert in atypical dementias, alongside fellow UCI MIND faculty members **Ali Ezzati, MD** (right), **Crystal M. Glover**, **PhD** (second from right), and **Joshua Grill, PhD** (left), were recently awarded an $18 million collaborative NIH grant they named, TRC-LATE.

TRC-LATE is a multi-site longitudinal study that will follow individuals 85 years and older to develop biomarkers for identifying LATE. These biomarkers will enable earlier diagnosis and facilitate clinical trial participation, advancing our understanding and treatment of this late-onset dementia.



- TRC-LATE will enroll participants at five leading Alzheimer's Disease Research Centers (ADRCs), with UCI serving as the lead site.
- Participants will receive comprehensive evaluations including cognitive testing, brain imaging, and blood draws to help identify disease biomarkers for LATE.
- Since individuals 85 and older are frequently excluded from clinical trials, the study will explore participants' perspectives on and willingness to join future treatment studies.
- Participants will also contribute data remotely using digital devices, making participation more convenient and accessible.

ENGAGING OUR COMMUNITY

To keep our community abreast of the latest research findings, to provide instructive learnings about brain health, and to ensure people have a place to turn for trusted information, UCI MIND devotes considerable energy to engaging Orange County communities.

Lupe Morales, MBA
Community Engagement Specialist

Ms. Morales was hired in 2025 through funding by the Alzheimer's Clinical Trials Consortium (ACTC). UCI MIND is a steering committee member of ACTC and several faculty play leadership roles in this important network.

Ms. Morales is working to establish community partnerships and build sustainable relationships to promote research participation, especially in clinical trials.

Deanna Dang
Staff Research Associate

Mrs. Dang was hired in 2023 as part of the Asian Cohort for Alzheimer's Disease (ACAD) Study at UCI MIND. ACAD is a large-scale, multisite research study conducted across North America to investigate and characterize the genetic risk factors for Alzheimer's disease in Asian American populations. Mrs. Dang works closely with the Vietnamese community in Orange County to enroll and interview participants for the study.

UCI MINDcast continues to deliver compelling video and audio content that showcases our researchers, highlights cutting-edge studies, and explores broader developments in ADRD research.

- **93** MINDcast videos
- **54** *Spotlight on Care* podcast episodes

In March, UCI MIND collaborated with the **UCI Claire Trevor School of the Arts**, Department of Music to host "*Finding Light: Alzheimer's Stories*" by Robert S. Cohen, a concert and educational event to highlight the impact of Alzheimer's disease.

This annual conference is a community collaboration between the Alzheimer's Association Orange County Chapter, Alzheimer's Orange County and UCI MIND.

This year's conference explored how genetics, environment, and lifestyle shape dementia risk, bringing together 325 attendees and 10 expert speakers.

BEALL SCHOLAR PROGRAM

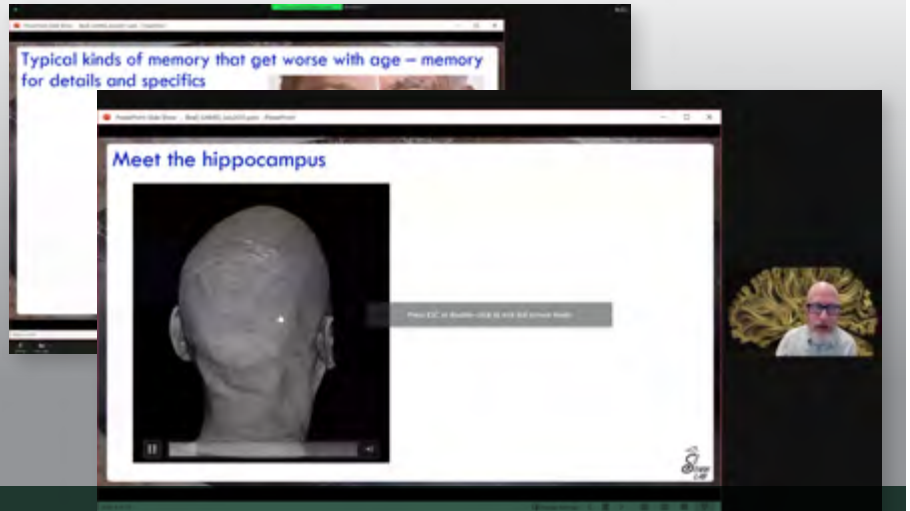
The 2025 Beall Scholar Class flanked by REMIND co-chairs and leadership.

"[I plan on] pursuing a Master's degree in Biology or Public Health before eventually applying to Medical School."

- Fernando 21' (UCI/ Biological Sciences)

Founded five years ago to inspire young people to pursue careers in neuroscience and geriatric medicine, the Beall Scholar Program is generously and continually supported by Don and Joan Beall.

- **78** OC students
- **20** local high schools



In 2021, the first program was held virtually due to the COVID pandemic. Dr. Craig Stark gave a talk to the scholars about memory and the tools used to image the brain.

"[It] had a pretty significant impact on my academic direction. The program really solidified my interest in neuroscience and exposed me to the world of research. It was part of the reason I chose to major in neuroscience. I also currently volunteer in two research labs because of this interest."

-Madison 21' (UCLA/Neuroscience)

In 2022, The Beall Scholar Program met for the first time in person. The clinical professions panel takes questions from the scholars about career trajectory.

2025: Graduate student, Alina Tu shows the scholars a mock MRI scanner.

"It was a pleasure to be a part of this year's cohort; I learned so much about the importance of neurodegenerative diseases, the UCI MIND Program, and more. I truly appreciate the effort and time it took to organize this summer program; the dedication and attention to detail was evident through the amazing lectures, panels, tours, games, [and] food..."

-Carla 25', Saddleback High School

"The Beall Scholar Program was definitely a key factor in acknowledging my potential and interest in medicine, especially in neuroscience. The labs and having guest speakers opened up a new field of medicine for me, which left me in awe and with lots of curiosity."

– Yoselin 24' (UCLA)

2024: A Beall Scholar explores how VR helps scientists study changes in spatial navigation with aging and dementia.

"[The] Program helped me finalize my decision to attend Cal State Fullerton because after the program ended, we had scheduled meetings about specific topics. A requirement was to research schools we were interested in, and that's when I discovered Fullerton was one of the top schools for my field."

– Esmeralda 24' (CSUF/Psychology)

"It greatly broadened my perspective on what other fields and focuses there are within research. Going into college, I always had the hope to pursue a career in psychology, but the Beall Scholar Program was helpful in seeing the physical science aspect of brain research...it helped me find my interest in Neuroscience and I've been attempting to lean more into that while here at Berkeley."

-Emmanuel 22' (UC Berkeley/Psychology)

2023: Graduate student Gema Olivarria teaching the Beall Scholars about the sympathetic nervous system.

2025: Dr. Melanie Tallakson, a nurse practitioner, speaks with a Beall Scholar.

"After engaging with all the speakers and participating in the activities during the 2023 Beall Scholar Program, I became increasingly interested in the brain and the various neurological diseases that can potentially affect it, which I believe aligns with my interests. The supportive staff also inspired me to continue networking and exploring potential research opportunities in the field."

- Thiery 23' (UCI/ Biological Sciences)

TRAINING IN TRANSLATIONAL ADRD NEUROSCIENCE (TITAN) T32

NIA training program

Purpose: Prepares early investigators to become national leaders in translational ADRD research

Goal: Reduce the impact of ADRD through cutting-edge research

Approach: Provides novel and essential training in translational neuroscience

Featured Trainee:

Victoria Espericueta

(Mentor: Edwin Monuki, MD, PhD)

I study choroid plexus epithelial cells. These cells are responsible for secreting most of the cerebrospinal fluid (CSF), and maintaining one of the two major barriers of the brain, the blood-CSF barrier. I admit to having gone most of my life without knowing about the choroid plexus and its epithelial cells but became fascinated by this unassuming tissue that plays important roles for our brain.

I work with a human induced pluripotent stem cell model where I direct the differentiation to choroid plexus epithelial cells through factors in the culture medium.

My project aims to model abnormalities seen in adult human choroid plexus tissue samples, such as very large lipid droplets, in my stem cell derived cultures to study the functional consequences of acquiring large lipid droplets. In addition to this, I study choroid plexus epithelial cells that carry the APOE4/4 genotype which is a risk factor for developing Alzheimer's disease, and I assess its impact on normal function.
Choroid plexus epithelial cells have historically been excluded in most of the neuroscience research. My work aims to highlight the choroid plexus and the role it plays in brain development and disease progression.

Through the TITAN-32 training grant, I have attended seminars with a wide range of speakers who highlight different angles of Alzheimer's disease research, including efforts to increase diverse representation through recruitment science, insights into the FDA clinical trial process and service on advisory committees, and the use of bioinformatics to identify biomarkers. This experience has broadened my research perspective and provided meaningful opportunities to connect with peers and experts in Alzheimer's disease research.

NEUROBIOLOGY OF AGING AND AD T32

NIA training program

This NIA funded T32 training grant supports:

Who: Pre-doctoral and postdoctoral scholars

What: Innovative research on aging and AD

Focus Areas: Cellular and molecular mechanisms of age-related neurodegeneration, brain plasticity during aging, and age-related changes in learning and memory

Approach: Uses molecular and quantitative research methods

Featured Trainee:

Elizabeth Andrews

(Mentor: Elizabeth Head, PhD)

The focus of my research is on characterizing Alzheimer's disease in people with Down syndrome, with an emphasis on how this disease impacts men and women differently. We're studying whether women with Down syndrome show more advanced Alzheimer's disease-related changes in their brains than men. This helps us understand if women may be further along in disease progression, even when symptoms appear similar. If women with Down syndrome have more advanced pathology, they may benefit from earlier intervention in Alzheimer's treatment trials. This knowledge helps guide more precise and equitable approaches to therapy.

Our work highlights the importance of studying sex differences and women's health in Alzheimer's disease research. It also informs better timing and design of clinical trials for people with Down syndrome. By revealing biological sex differences in Alzheimer's disease, our work improves understanding of how the disease develops and progresses. These insights may extend beyond Down syndrome to the broader Alzheimer's population. The T-32 program has given me essential training in translational neuroscience and career development while helping me connect laboratory findings to real-world clinical applications.

"We primarily use immunohistochemical techniques and digital pathology tools to examine postmortem human brain tissue. This allows us to measure key Alzheimer's disease-related proteins like amyloid beta and phosphorylated tau."

RESEARCH AND EDUCATION IN MEMORY IMPAIRMENTS AND NEUROLOGICAL DISORDERS (REMIND)

The graduate students and postdoctoral scholars that lead the volunteer organization REMIND, inspire the next generation of neuroscientists through academic and community outreach.

FEATURED TRAINEE

Zoe Treadwell

Experimental Pathology Graduate Student & REMIND Co-Chair

(Mentor: Elizabeth Head, PhD)

RESEARCH INTEREST

I became interested in studying Alzheimer’s disease after the passing of my grandmother. She suffered from Alzheimer’s and I saw the effect it had on my family. The therapeutic-facing nature of my project helps my work to feel hopeful and I am so grateful to have the opportunity to work on a project that may one day provide a preventative treatment for AD and related dementias.

I am examining the effect of long-term (5 year) treatment with Tacrolimus (an FDA approved immunosuppressant drug) on the amount of amyloid-beta in the brain of aging dogs. Dogs naturally and spontaneously develop amyloid-beta accumulation (typically called plaques) and cognitive decline similar to humans. This model can tell us a lot about how amyloid-beta build-up contributes to cognitive impairment and decline in both dogs and humans.

REMIND INTEREST

I participate in REMIND because I enjoy outreach and getting people interested in neuroscience and neurodegenerative research. There can be a lot of stigma and shame surrounding neurodegenerative disorders and sharing knowledge is the best way to destigmatize.

Additionally, REMIND does a lot of great work with high school students in the area and its always so fun and inspiring to see how engaged and excited the students are about neuroscience and research about neurodegeneration.

THE RESEARCH AND MENTORSHIP PROGRAM (RAMP)

RAMP provided second-year medical students a mentored summer research experiences under the guidance of UCI MIND faculty mentors.

The program is supported by a NIA T35 training grant and by philanthropy from Seth Rogen and Lauren Miller Rogen's *Hilarity for Charity* and Dr. Lorna Carlin.

CURRENT TRAINEE SPOTLIGHT:

Miranda Saathoff, 2025 RAMP Scholar
(Mentor: Patrick Chen, MD)

I chose to study traumatic brain injury (TBI) and dementia with Dr. Chen for deeply personal reasons, as I have lost family members to TBIs, including one in the setting of advanced dementia. I'm also interested in a career in emergency medicine or trauma surgery, and this project aligns well with those goals. With TBIs becoming more prevalent in the geriatric population, I saw this as an opportunity to contribute to advancing care in a meaningful way.

My project focuses on patients admitted to the ICU with moderate to severe TBIs. We analyzed their brain scans to see if there were signs of pre-existing dementia. The goal was to determine whether imaging evidence of dementia could predict ICU outcomes.

This project was a retrospective analysis of an existing prospective cohort study. We used logistic regression models to estimate the likelihood of poor outcomes, defined by the modified Rankin Scale at discharge. These models accounted for factors such as dementia-related imaging findings, patient age, sex, and initial GCS score.

I have already submitted an abstract to the Society for Critical Care Medicine Annual Congress in March 2026. Looking ahead, I hope this work will also serve as the foundation for a future manuscript.

PAST TRAINEE SPOTLIGHT:

Casey Vanderlip, 2023 RAMP Scholar
(Mentor: Craig Stark, PhD)

My work focuses on detecting Alzheimer's, before symptoms have set in. I was drawn to this area because the disease can brew silently for years, and my grandfather's experience made me wish we could have seen it coming earlier. I develop practical tests that can fit into regular clinic visits.

Think of my project as an "eye exam" for the brain: I'm studying whether a quick digital memory game plus a simple blood draw can, together, flag near-term risk. We're testing if this combo can catch changes earlier, help doctors decide who needs follow-up or treatment, and help clinical trials enroll the right people at the right time.

Clinically, these tools could help those primary care and memory clinics triage patients who need specialty testing or closer follow-up. For trials, they can enrich enrollment with people likely to decline, reducing sample sizes, time, and cost.

In the next decade, I see Alzheimer's care moving toward precision prevention and treatment. As therapies mature, the challenge becomes identifying the right people at the right moment, using simple clinic-friendly checks and smart risk scores to direct resources where they help most.

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