

MAY 2025 | ISSUE 16

BIOMEDICAL GENETICS SECTION

QUARTERLY NEWSLETTER

Section Updates

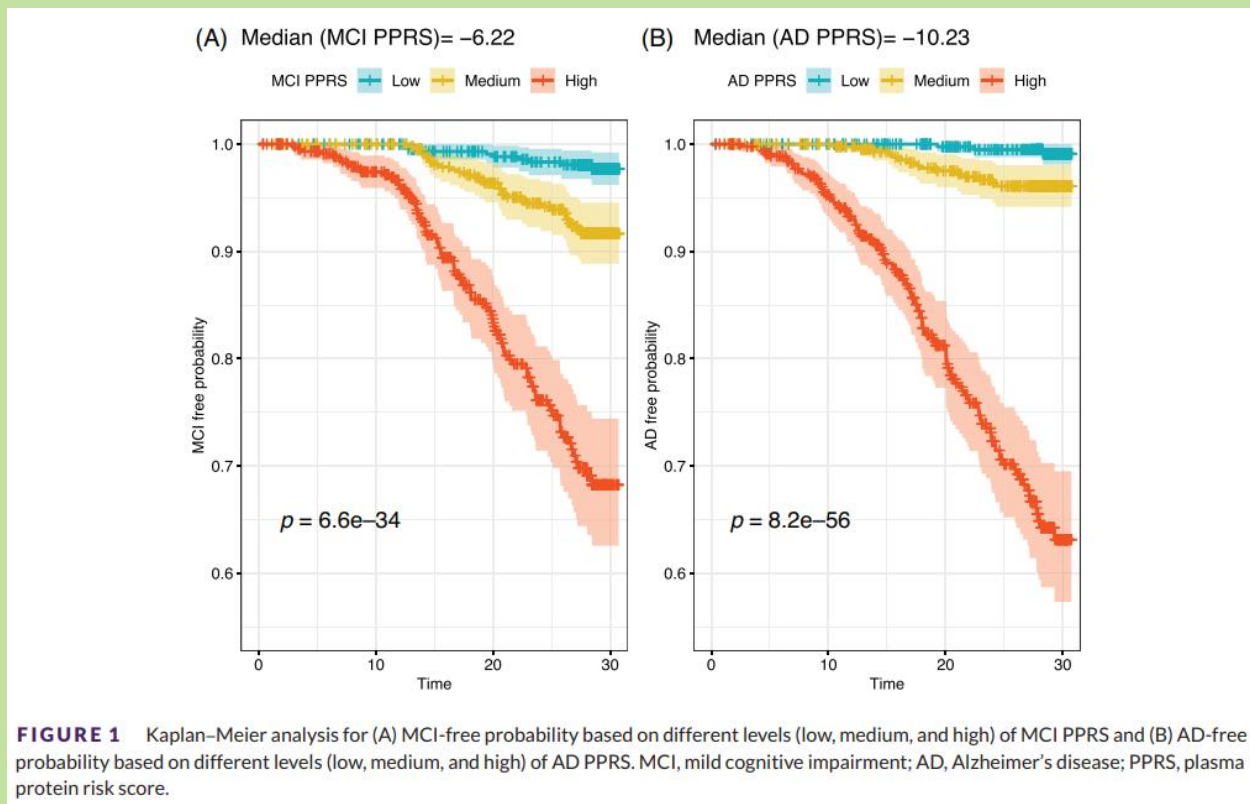
**THANKS TO ALL
WHO CAME
TO OUR GENETICS
SPRING PIZZA PARTY!**



**Congratulations to Huiping Zhang on your
recent promotion to the title of Professor! 🎉**

Some Recent Publications

1. **Rehman H**, Ang TFA, Tao Q, Au R, Farrer LA, Qiu W[†], Zhang X[†]. Plasma Protein Risk Scores for Mild Cognitive Impairment and Alzheimer Disease in the Framingham Heart Study. *Alzheimer's & Dementia*. 2025 Mar;21(3):e70066. [PMID: 40156298](#)



Introduction: It is unclear whether aggregated plasma protein risk scores (PPRSs) could be useful in predicting the risks of mild cognitive impairment (MCI) and Alzheimer's disease (AD).

Methods: The Cox proportional hazard model with the Least Absolute Shrinkage and Selection Operator penalty was used to build the PPRSs for MCI and AD in 1515 Framingham Heart Study Generation 2 with 1128 proteins measured in plasma at exam 5 (cognitively normal [CN] = 1258, MCI = 129, AD = 128).

Results: MCI PPRS had a hazard ratio (HR) of 6.97 [5.34, 9.12], with a discriminating power (C-index = 82.52%). AD PPRS had a HR of 5.74 [4.67, 7.05] (C-index = 88.15%). Both PPRSs were also significantly associated with cognitive changes, brain atrophy, and plasma AD biomarkers. Proteins in the MCI and AD PPRSs were involved in several pathways related to leukocyte, chemotaxis, immunity, inflammation, and cellular migration.

Discussion: This study suggests that PPRSs serve well to predict the risk of developing MCI and AD as well as cognitive changes and AD-related pathogenesis in the brain.

2. Sousa A, Besong OTO, Wachman EM, Taglauer ES, Beane JE, Kefella Y, Koo JS, Saia K, Jones HE, **Zhang H**. Placental transcriptome analysis in opioid-exposed versus non-opioid exposed pregnancies. *Placenta*. 2025 Mar 25; 162:27-34. PMID: 39983471; PMCID: PMC11908891; DOI: 10.1016/j.placenta.2025.02.012

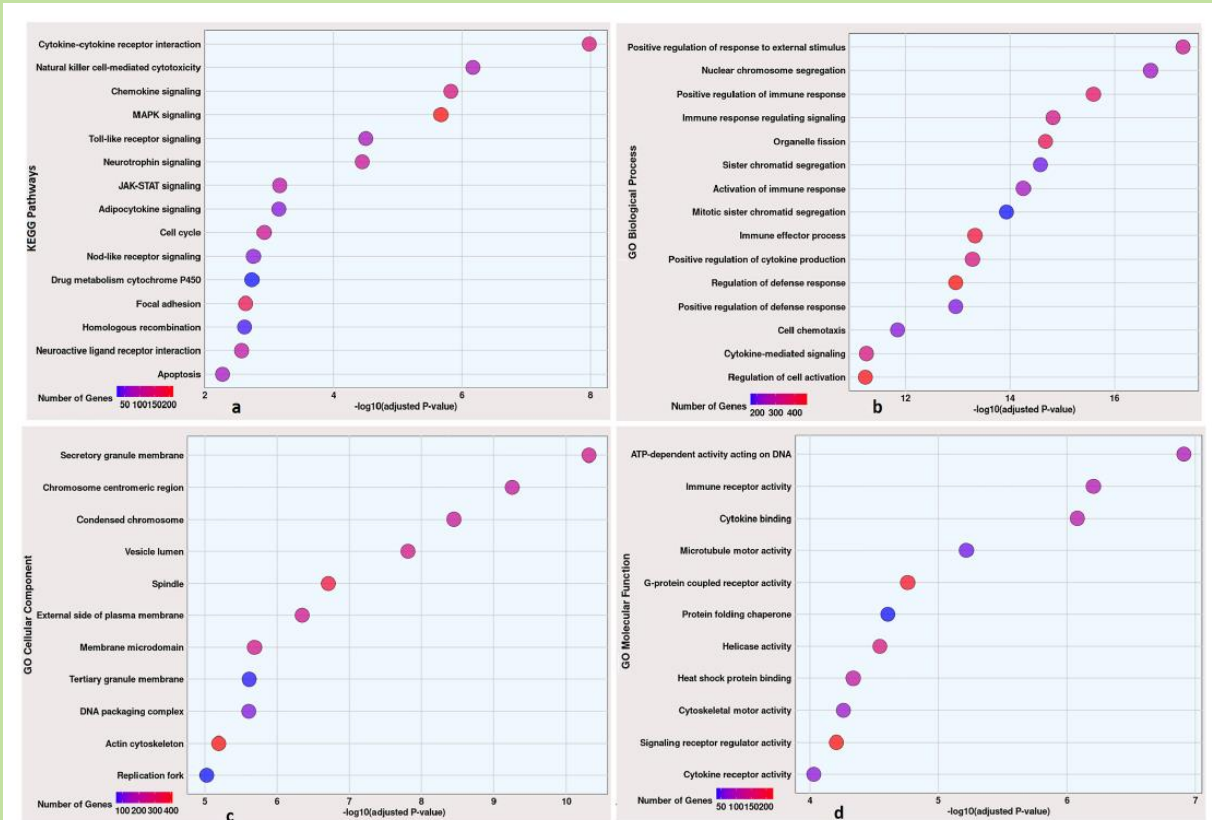


Fig. 2. Bubble plots of enriched KEGG pathways and gene ontology (GO) terms.

Bubble plots illustrate enriched KEGG pathways and GO terms. KEGG pathways: Kyoto Encyclopedia of Genes and Genomes pathways; GO_BP: Gene Ontology - Biological Process; GO_CC: Gene Ontology - Cellular Component; GO_MF: Gene Ontology - Molecular Function.

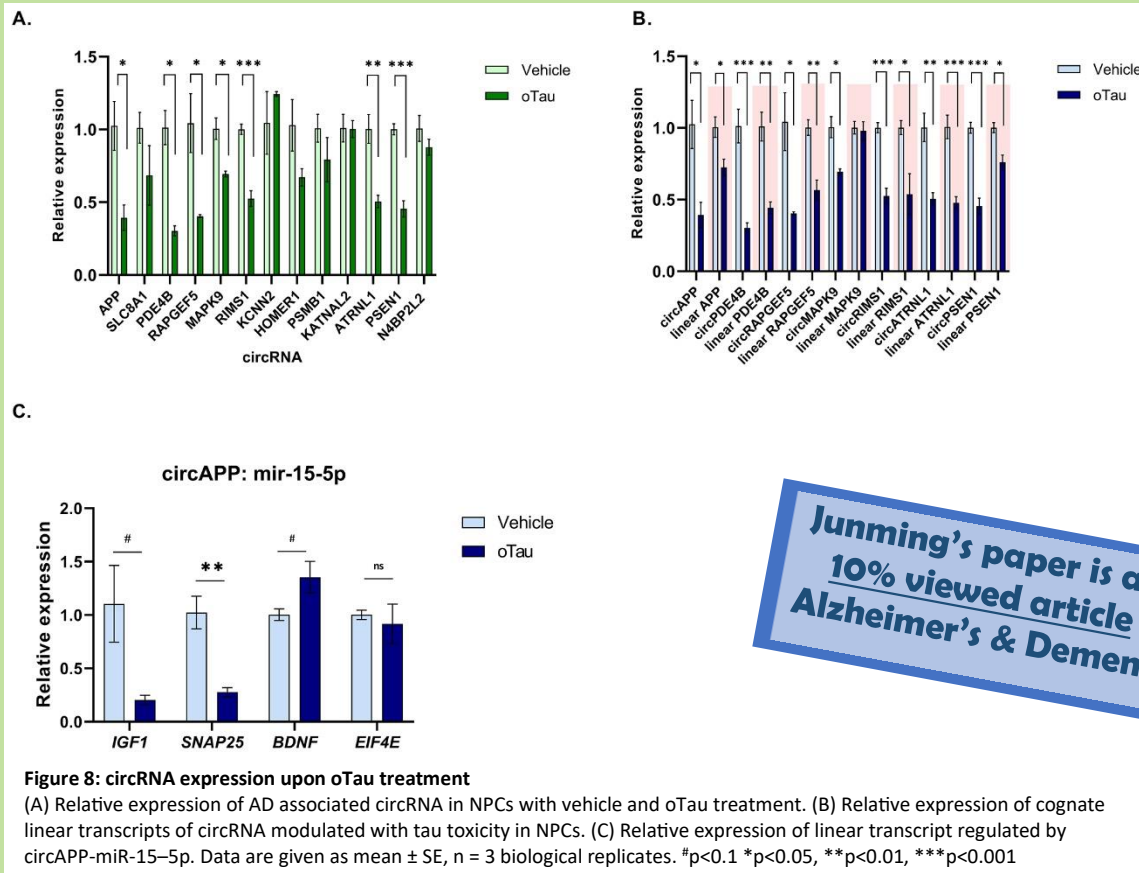
Introduction: Opioid exposure during pregnancy may significantly alter gene expression in the placenta, potentially disrupting its function and influencing fetal brain development. These alterations may contribute to adverse outcomes such as neonatal opioid withdrawal syndrome (NOWS). In this study, we aim to systematically investigate the changes in placental gene expression associated with maternal opioid exposure to better understand the underlying molecular mechanisms and their implications for fetal health.

Methods: Fresh placental tissue samples were collected from 18 opioid-exposed pregnancies and 26 non-opioid-exposed control pregnancies. Transcriptomic changes related to opioid exposure were assessed using RNA sequencing (RNA-seq).

Results: Among the 16,172 genes detected, 55 showed differential expression ($P_{\text{adjusted}} < 0.25$ or $P_{\text{unadjusted}} < 0.001$) in opioid-exposed placentas. Gene Set Enrichment Analysis (GSEA) revealed that the differentially expressed genes were primarily associated with immune responses, neuronal development and function, as well as cell replication and division. Computational deconvolution using the PlacentaCellEnrich program identified significant enrichment of upregulated genes in decidual NK cells. Furthermore, integrative analysis of DNA methylation and gene expression showed an enrichment of differentially methylated genes among downregulated genes in opioid-exposed placentas.

Discussion: Our findings suggest that opioid exposure during pregnancy may disrupt critical placental pathways, particularly those involved in immune responses. Future studies focusing on transcriptomic changes in specific placental cell types will be essential for fully understanding the structural and functional alterations in the placenta due to opioid exposure during pregnancy.

3. Puri S*, **Hu J***, Sun Z, Lin M, Stern TD, Farrer LA, Wolozin B[†], Zhang X[†]. Identification of circRNAs Linked to Alzheimer's Disease and Related Dementias. *Alzheimer's & Dementia*. 2023 Aug;19(8):3389-3405. [PMID: 36795937](#). (* equal contribution)



Junming's paper is a top 10% viewed article in Alzheimer's & Dementia!

Introduction: Circular RNAs (circRNAs) exhibit selective expression in the brain and differential regulation in Alzheimer's disease (AD). To explore the role of circRNAs in AD, we investigated how circRNA expression varies between brain regions and with AD-related stress in human neuronal precursor cells (NPCs).

Methods: Ribosomal RNA-depleted hippocampus RNA-sequencing data were generated. Differentially regulated circRNAs in AD and related dementias were detected using CIRCexplorer3 and limma. circRNA results were validated using quantitative real-time PCR of cDNA from the brain and NPCs.

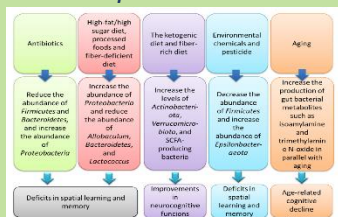
Results: We identified 48 circRNAs that were significantly associated with AD. We observed that circRNA expression differed by dementia subtype. Using NPCs, we demonstrated that exposure to oligomeric tau elicits downregulation of circRNA similar to that observed in the AD brain.

Discussion: Our study shows that differential expression of circRNA can vary by dementia subtype and brain region. We also demonstrated that circRNAs can be regulated by AD-linked neuronal stress independently from their cognate linear messenger RNAs (mRNAs).



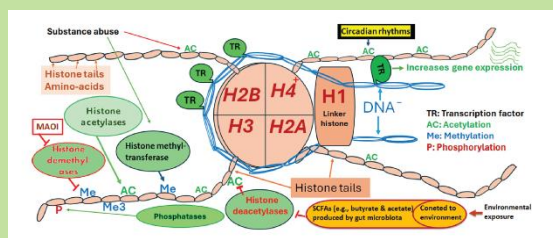
Articles by Dr. Sam Thiagalingam and colleagues on the microbiome and environmentally induced epigenetic alterations and their regulation for disease prevention and treatment.

4. *Nohesara S, Mostafavi Abdolmaleky H, Pettinato G, Pirani A, Thiagalingam S, Zhou JR. 2025. IUPHAR review: Eating disorders, gut microbiota dysbiosis and epigenetic aberrations. Pharmacol Res. 2025 Mar;213:107653. doi: 10.1016/j.phrs.2025.107653. Epub 2025 Feb 17. PMID: 39970995*



This review highlights how microbiome-based therapeutics and specific dietary interventions can contribute to improving various subtypes of eating disorders (EDs) by modulating gut microbial communities and mitigating epigenetic aberrations.

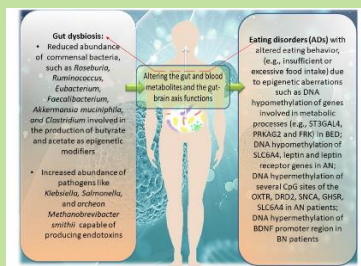
5. *Abdolmaleky HM, Nohesara S, Zhou JR, Thiagalingam S. 2025. Epigenetics in evolution and adaptation to environmental challenges: pathways for disease prevention and treatment. Epigenomics. 2025 Apr;17(5):317-333. doi: 10.1080/17501911.2025.2464529. Epub 2025 Feb 13. PMID: 39948759*



Alongside genetic mutations that provide adaptive potential during environmental challenges, epigenetic modifications offer dynamic, reversible, and rapid mechanisms for regulating gene expression in response to environmental changes in both evolution and daily life, without altering DNA sequences or relying on accidental favorable mutations.

Remarkably, environmentally induced epigenetic alterations are passed to daughter cells and inherited transgenerationally through germline cells, shaping offspring phenotypes while preserving adaptive epigenetic memory. Therefore, by proactively engineering environmental conditions, including both external and internal ecosystems (e.g., the gut microbiome), one could purposefully modulate the epigenome for disease prevention.

6. *Nohesara S, Abdolmaleky HM, Dickerson F, Pinto-Tomás AA, Jeste DV, Thiagalingam S. Maternal Gut Microbiome-Mediated Epigenetic Modifications in Cognitive Development and Impairments: A New Frontier for Therapeutic Innovation. Nutrients. 2024 Dec 17;16(24):4355. doi: 10.3390/nu16244355. PMID: 39770976*



The composition and diversity of resident bacteria in the gastrointestinal tract shaped by environmental factors could influence the brain epigenome, affecting behavior and cognitive functions. This article explores the potential roles of nutritional deficiencies in programming cognitive disorders during the perinatal period in offspring, as well as the promise of gut microbiome-targeted therapeutics with epigenetic effects to prevent or alleviate cognitive dysfunctions in infants, middle-aged adults, and older adults.

FHS-BAP had their 5th Annual Symposium in April

Watch the recording [HERE](#).

Impact of the Exposome on Risk of Alzheimer's Disease and Related Dementias

Impact of the Adverse Social Exposome on Risk of Alzheimer Disease and Related Dementias



**Amy Kind,
MD, PhD**

University of Wisconsin
School of Medicine

Unraveling Environmental Contributions to Alzheimer's Disease: A Closer Look at the Exposome



**Richard Kwok,
PhD**

National Institutes of Health

Using high-resolution mass spectrometry to study Alzheimer's disease



**Gary Miller,
PhD**

Columbia University

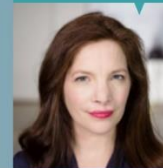
Neural Exposome Factors in the Onset and Progression of Alzheimer's Disease and Related Dementias: Experimental Approaches and Clinical Implications



**Giulio Maria Pasinetti,
MD, PhD**

Icahn School of Medicine at Mount Sinai

Some dirt might hurt: what we know about the effects of common environmental exposures on dementia risk



**Jennifer Weuve,
MPH, ScD**

Boston University School of Public Health

Resilience and Risk to Alzheimer's Disease and Related Dementias; Lifecourse Contributions to Disparities in Brain Health



**Rachel Whitmer,
PhD**

UC Davis Medical Center

View the Newly Re-Launched FHS-BAP Website!

<https://www.bumc.bu.edu/fhs-bap/>

Framingham Heart Study Brain Aging Program

Boston University Chobanian & Avedisian School of Medicine



GENETICS 4TH OF JULY ICE CREAM PARTY

**JUNE 30th
@3PM**



**E201
Classroom**



Come make your own
ice cream sundae or cone.
Celebrate summer with us!



Please RSVP to Vidriana by June 23rd!



BUMC Upcoming Events & Programs

May 20th and 21st: McCahan Education Day Events



The mission of the McCahan Medical Campus Education Conference is to foster a vibrant educational community that supports, develops and disseminates the best teaching practices and research within a dynamic, collaborative and inclusive learning environment.

Theme: Tradition & Transformation

- **Keynote Speaker:** Karen H. Antman, MD, BUMC provost and dean, Chobanian & Avedisian School of Medicine

Schedule: <https://www.bumc.bu.edu/jmedday/schedule/>

Registration: <https://www.bumc.bu.edu/jmedday/registration/>

A Celebration on the Talbot Green Recognizing
Karen Antman, MD

Wednesday, May 21
4-6 p.m.

BU Boston University Medical Campus

Please join us as we honor BU Medical Campus Provost and Dean, Chobanian & Avedisian School of Medicine Karen Antman, MD, and recognize her two decades of leadership and service to the Medical Campus and school. Gather with fellow faculty, staff and students on the Talbot Green in celebration of this remarkable milestone.

May 21st: Celebration of Dean Antman

Submit a congratulatory message to Dr. Antman [HERE](#).

Let them know you are attending [HERE](#).



Narrative Writing Program at BUMC

Applications Due: May 26



Program runs from October 2025 to June 2026.

BUMC Narrative Writing Program (NWP) helps faculty develop narrative skills, confidence and compassion through reflective writing, literary analysis and workshops, guiding them to craft and revise non-research pieces, such as essays, fiction, or poetry suitable for publication.

Web Site: <https://www.bumc.bu.edu/facdev-medicine/all-bumc/narrative-writing-program/>

Contact: Teresa Acosta | bumcfdd@bu.edu | (617) 358-3563

Women's Leadership Program at BUMC

Applications Due: May 26



Program runs from October 2025 to June 2026.

BUMC Women's Leadership Program (WLP) is a longitudinal program for BUMC women faculty, equipping them with leadership skills through self-assessment, seminars, experiential learning and mentorship to navigate and impact academic medicine.

Web Site: <https://www.bumc.bu.edu/facdev-medicine/all-bumc/womens-leadership-program/>

Contact: Teresa Acosta | bumcfdd@bu.edu | (617) 358-3563

Faculty Development Program at BUMC

Applications Due: May 26



Program runs from October 2025 to June 2026.

BUMC Marcelle M. Willock, MD, Faculty Development Program (MWP) is a longitudinal leadership and career development program for BU Medical Campus faculty, fostering community, belonging and skills to navigate academic health sciences.

Web Site: <https://www.bumc.bu.edu/facdev-medicine/all-bumc/fdp-program/>

Contact: Teresa Acosta | bumcfdd@bu.edu | (617) 358-3563



BUMC News

Research Computing Services



The Shared Computing Cluster (SCC) will be **offline** Monday, June 2, 7 am to Wednesday, June 4, 9 am while the MGHPCC, which houses the SCC, undergoes scheduled annual maintenance.

RCS will post updates before, during, and after the downtime on the **SCC Status Page** at <https://www.bu.edu/tech/support/research/whats-happening/updates/>.

- **Downtime:** Monday, June 2, 7 am to Wednesday, June 4, 9 am.
- **Services Impacted:** SCC (SCC OnDemand, login nodes, batch nodes, home directories, project disk space), Linux Virtual Lab, and class.bu.edu.
- **Queue Draining:** The SCC scheduler will not dispatch jobs that have specified a runtime that extends beyond June 2 at 6 am. These jobs will remain pending and will run when the system returns to normal operation on June 4 at 9 am.

Please email help@scc.bu.edu if you have any questions or concerns.

BU Launches Convergent Research and Education Task Force



The task force, led by Dr. Darrell Kotton and Kenneth Lutchen, is a new push for collaborative research, aiming to step up progress on major societal challenges. They will be charged with seeking the valuable perspectives of faculty and staff from across the University.

Read more information about the task force [HERE](#).

NSF F&A Update and Guidance



On Friday, May 2, the National Science Foundation [announced](#) a 15% F&A cap on new awards to institutions of higher education effective Monday, May 5. Administration Transition Info & Resources can be found [HERE](#).



Accelerating Implementation of the NIH 2024 Public Access Policy

NIH has [announced](#) that the [2024 NIH Public Access Policy](#) will now go into effect on July 1, 2025. That change is meant to provide speedier public access to NIH-supported research findings. All other aspects of the 2024 Public Access Policy remain the same. The [current NIH Public Access Policy](#) remains in effect through June 30, 2025.

You can read the [NIH Director's statement](#) and this [blog](#) from the NIH Office of Science Policy for more information on the 2024 Public Access Policy and this change.

NIH Automatic NCE Link Removed in eRA Commons

On May 7, National Institutes of Health (NIH) [announced](#) that they have temporarily disabled the No-Cost Extension (NCE) functionality in eRA Commons. Temporarily disabling the NCE functionality in eRA Commons will allow NIH staff to review and assess all NCE requests to confirm that the activities proposed during the extension align with NIH mission and agency priorities. Details of the notice in full can be found [HERE](#).

New NIH Foreign Subaward Structure Enhances Integrity, Accountability, Oversight, and National Security of NIH Funded Research

Effective with the next NIH award cycle, all NIH-funded research involving foreign [subawards](#) must be structured as subprojects directly linked to the prime award. Foreign subawards are prohibited from being nested under the parent grant. [Read more](#).



Support Pathways for the BU Global Community

BU has launched [BU Support Pathways](#) which provides resources for members of our community who are concerned about their safety, security, and privacy due to shifting federal immigration and/or visa policies. This program is to support students, faculty, and staff and offer services including but not limited to:



- No-cost confidential initial legal consultation for eligible community members to discuss current immigration or visa status.
- Information about requesting summer housing for those who choose to stay on campus this summer.
- Education and answers to Frequently Asked Questions.

The BU Support Pathways website will serve as a centralized hub for information on immigration and visa matters, international travel, mental health, social services, academic support, and more. Please contact supportpath@bu.edu with any questions or concerns. We will continue to expand these resources to ensure ongoing support for all community members with immigration or visa-related needs.



Office of the President

Steps to Support BU's Financial Health from the Office of the President

(See Next Page →)

March 26, 2025

Dear Members of Boston University's Faculty and Staff,

Over the past few months, we have communicated with you about the University's budget. As we move through the budget process, we want to be transparent about our findings and the steps we will take to address our short- and long-term financial health.

Overall, our University has a strong financial foundation. However, we are not immune to the realities affecting many of our peer institutions. There are a variety of pressures on our budget, many of which have built over time, and other challenges that have emerged more recently.

Immediately, we will take steps to balance the budget. We will adjust upcoming enrollment targets, look for additional revenue opportunities, and decrease spending. In addition, we have made the very difficult decision not to provide annual merit increases this year for faculty and staff. We know that merit increases are important to our community members and that this news is difficult. We did not enter this decision lightly, but it will allow us to mitigate potential layoffs. Yet, these broad solutions are not enough. Later today, we will share specific instructions with department leaders regarding budget reduction targets, and in the coming months, we will examine our budget model and further hone the University's strategic vision.

Budget Information

While we have communicated frequently about the budget, we know that many of you may be surprised and have questions. With that in mind, we want to share some detailed information that may provide helpful context.

The University develops its annual budget with a goal to cover expenses and set aside enough in reserves for planned strategic investments. This basic and prudent practice has allowed us to pursue new ideas and seize opportunities that have contributed to our progress through the years. These reserves are critical to sustaining the University's competitive position and maintaining the quality of our academic and research programs. They are used for the day-to-day operations of the University and to support current or future commitments and investments, including faculty start-up packages and recruitment, academic initiatives, research centers, revenue-sharing agreements with schools and colleges, laboratory and classroom renovations, and other capital projects.

Since Fiscal Year 2022, Boston University's reserves have dropped significantly, and they are expected to drop even further this year.

There are several reasons for these declines:

- Inflation has had a significant impact on our expenses, which have grown much faster than our revenues since pandemic restrictions were lifted in 2022.
- Master's degree enrollments are down compared to budgeted targets, as they are at colleges and universities across the country. Last fall, our master's programs missed revenue targets by \$38 million, based on lower enrollments due to fewer applicants and unusually low yield. Unfortunately, this is a trend that we and many of our peers must continue to account for moving forward.
- Salaries and wages have increased more than anticipated.
- Stabilizing the University's new Student Information System has been costly. This year, we anticipate spending \$13 million in one-time funding to realign the project and get it back on track. Additionally, we will allocate \$2.7 million annually to maintain the system's optimal performance.
- We are graduating one of our largest classes of undergraduate students, admitted in the fall of 2021, which has helped to offset inflationary pressures in recent years. Further constraints on our housing inventory, due to the renovation of Warren Towers over the next three years, will limit our ability to accommodate similarly large classes in the immediate future.

Next Steps

Given these factors and national uncertainties, it is likely that universities will face more budgetary challenges in Fiscal Year 2026 and beyond. Thus, following the immediate steps described above, we will begin strategic planning and a close examination of our budget model. As you know, we are not alone in the financial challenges that face higher education. Many institutions are taking steps to prepare for potential shortfalls. We, too, must be deliberate about our operations and make decisions that best promote our highest priorities to achieve the future we envision.

Looking Ahead

While these times are challenging, we cannot retreat. Boston University's commitment to helping society is more important than ever. If we are to continue leading in research, scholarship, teaching, learning, and service, we must take this moment to rethink how we operate, allowing us to achieve even greater success.

We are entering a critical period that will require creative thinking and innovative approaches to reach our current and future goals. Many efforts are already underway, such as our vision to strengthen our partnership with Boston Medical Center. This collaboration will help us reduce duplication, streamline processes, and leverage our important role in Boston's healthcare landscape.

As a bold and dynamic institution, we are known for overcoming challenges and making things happen. Our culture of creativity and innovation will continue to serve us well, as it has in the past. We remain confident in our future because of you—our dedicated faculty and staff—who are vital to our shared mission. Thank you for everything you do for our community.

Sincerely,

Melissa Gilliam, President
Gloria Waters, University Provost and Chief Academic Officer
Nicole Tirella, Senior Vice President, Chief Financial Officer, and Treasurer



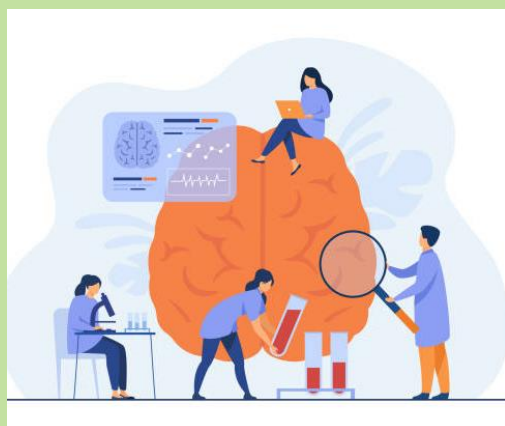
BUMC Funding Opportunities

Toffler Scholar Program

Applications Due: June 2nd

Funding: \$40,000-\$50,000 per project

Karen Toffler Scholar Program funds early-stage, innovative neuroscience research by early career university-based researchers. It supports projects often overlooked by traditional funders. PhD students, postdocs, assistant professors and clinical fellows may apply. Prior Toffler applicants or those with major external funding are ineligible. BMC investigators are excluded.



Research focus is neuroscience-related studies, including:

- Early detection biomarkers
- Translational science
- Precision technology tools
- Disease mechanisms for prevention
- Population studies on brain health trends

Web Site: <https://www.bumc.bu.edu/camed/research/find-funding-2/limitedfo/#toffler>

Contact: Associate Dean of Research | adrbumc@bu.edu | (617) 358-2304

BU CTSI Integrated Pilot Award Program

Applications Due: July 31st

Anticipated grant award announcements in Fall 2025 with a start date of December 1, 2025.



Important Changes Beginning This Cycle:

- Maximum funding is \$25,000 for both individual and multi-PI grants.
- Proposals must focus on Translational Science and address at least one translational science principle.
- Funding is contingent upon CTSI budget availability.

Web Site: <https://www.bu.edu/ctsi/support-for-research/integrated-pilot-grant-award-program/2025-bu-ctsi-integrated-pilot-award-program-qa-session/>

Contact: CTSI Services | ctsisvcs@bu.edu | (617) 358-7327



IDEAS FOR YOUR

Summer Bucket List

- ☐ Bike the Minuteman Bikeway
- ☐ Swan Boats @ the Public Garden
- ☐ Red Sox game @ Fenway Park
- ☐ Kayak on the Charles River
- ☐ Go on a Whale Watch
- ☐ Day trip to Good Harbor Beach (Gloucester)
- ☐ Tour a Local Brewery (Night Shift, Downeast, Harpoon)
- ☐ Visit the SoWa Open Market in the South End
- ☐ Walk the entire Freedom Trail
- ☐ Listen to a Free Concert @ the Hatch Shell
- ☐ Do a North End cannoli crawl
- ☐ Watch an outdoor movie in Central Square
- ☐ Take the ferry to Provincetown





Resources

Don't Forget-- Submit an *Announcement Request Form* and share your news in the next issue of the Biomedical Genetics Section Newsletter!

Do you have exciting news that you want to share in the next issue of our quarterly Biomedical Genetics Section Newsletter? Submit an [Announcement Request Form](#), located on the Resources page of our [website](#)!