Environmental Impacts on Neurodegeneration

An IOA Sylvan M. Cohen Annual Retreat & Poster Session

Co-sponsored by the Center of Excellence in Environmental Toxicology (CEET)

March 11, 2025 • 8:30am - 4:30pm • University of Pennsylvania

Institute on Aging
University of Pennsylvania

Perelman School of Medicine
University of Pennsylvania

CEET
Center of Excellence in Environmental Toxicology

8:30 - 9:00am	**Breakfast**
9:00 - 9:30am	**Welcome & Opening Remarks**
9:30 - 10:30am	***"Smarter Screening: Using Planarian Behavior to Reduce Animal Usage in Neurotoxicity Testing and Neurotherapeutic Drug Discovery"*** **Eva-Maria Collins, PhD** • Associate Professor in Biology at Swarthmore College
10:30 - 10:40am	**Break**
10:40 - 11:00am	***"Exposure to environmental toxicants and AD/ADRD risk in CARDIA"*** **Aimin Chen, MD, PhD** • Professor of Epidemiology, University of Pennsylvania
11:00 - 11:20am	***"Epigenetics & the Environment: A Biosocial Framework for Understanding Age-Associated Pathology"*** **Corey McMillan, PhD** • Associate Professor of Neurology, University of Pennsylvania
11:20 - 11:40am	***"Environmental Neuropathology of Alzheimer's Disease"*** **Edward B. Lee, MD, PhD** • Associate Professor of Pathology and Laboratory Medicine, University of Pennsylvania
11:40 - 12:00pm	***"Wildfire Smoke Exposure and Incident Dementia"*** **Holly Elser, MD, PhD, MPH** • Neurology Resident, Hospital of the University of Pennsylvania
12:00 - 1:00pm	**Lunch and Poster Viewing**
1:00 - 1:20pm	***"Powered by Numbers: Leveraging Epidemiological Data to Accelerate Research to Improve Long-Term Cognitive Outcomes in Traumatic Brain Injury"*** **Andrea Schneider, MD, PhD** • Assistant Professor of Neurology, University of Pennsylvania
1:20 - 1:40pm	***"Immune Signals and Brain Health: How Environmental Stimuli Shape the CNS"*** **Yeong Shin Yim, PhD** • Assistant Professor of Pharmacology, University of Pennsylvania
1:40 - 2:00pm	***"New Insights into the Pathologies of Traumatic Brain Injury Related Neurodegeneration"*** **Victoria Johnson, MBCHB, PHD** • Assistant Professor of Neurosurgery, University of Pennsylvania
2:00 - 2:20pm	***"Factoring Sleep Disruption into the Neural Exposome"*** **Sigrid Veasey, MD** • Professor of Medicine, University of Pennsylvania
2:20 - 2:45pm	**Break**
2:45 - 3:45pm	***"Using exposomics to study neurodegeneration"*** **Gary Miller, PhD** • Professor of Environmental Health Sciences, Columbia University
3:45 - 4:30pm	**Poster Session**
4:30pm	**Poster Award Announcements**

Keynote Speakers

Eva-Maria Collins, PhD

Associate Professor in Biology, Swarthmore College

Eva-Maria Collins, PhD, is an Associate Professor in Biology at Swarthmore College, an Adjunct Associate Professor in Neuroscience at the Perelman School of Medicine at the University of Pennsylvania, and an Adjunct Member of the Center of Excellence in Environmental Toxicology (CEET) in the Environmental Neuroscience Thematic Area.

Dr. Collins is an expert in high-throughput chemical screening using freshwater planarians to identify compounds that affect neurodevelopment and neuronal function. She has pioneered the use of rapid screening in planarians as an alternative organismal model to reduce mammalian testing. Her ongoing work is funded by the CEET, NIH, NSF, and The Center for Alternatives to Animal Testing at John Hopkins University. She currently serves as a board member for the American Society for Cellular and Computational Toxicology and on the Society of Toxicology, Education and Experiential Opportunities Committee. She has published over 50 peer-reviewed articles, many of whom have been co-authored by undergraduate students trained in her laboratory. She strives to inspire the next generation of scientists and through numerous outreach activities has created opportunities for middle and high school-age students from local communities to engage with her research.

Gary Miller, PhD

Professor of Environmental Health Sciences (in Molecular Pharmacology and Therapeutics), Columbia University

Dr. Miller serves as Vice Dean for Research Strategy and Innovation, Professor of Environmental Health Sciences, Professor of Molecular Pharmacolgy and Therapeutics, and Director of the Center for Innovative Exposomics. Dr. Miller is a leader in the field of exposomics, which studies the comprehensive and cumulative effects of physical, chemical, biological, and social factors that influence biology and health. His team has been supported by NIA, NINDS, and NIEHS for his research on environmental drivers of neurodegeneration. He serves on the advisory panel of the National Institutes of Health All of Us Research Program.

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Penn Presenters

Aimin Chen, MD, PhD

Professor of Epidemiology, University of Pennsylvania

Dr. Aimin Chen is Professor of Epidemiology in the Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania. He is Co-Director of Philadelphia Regional Center for Children's Environmental Health (PRCCEH) and Associate Director of the Translational Research Support Core (TRSC) in the Center of Excellence in Environmental Toxicology (CEET) at the University of Pennsylvania. As an environmental epidemiologist, his research includes informal electronic waste recycling exposure and child development; exposure to polybrominated diphenyl ethers (PBDEs) and per- and polyfluoroalkyl substances (PFAS) and child neurobehavioral development; developmental neurotoxicity of organophosphate ester (OPE) and replacement brominated flame retardants; environmental chemical mixture exposure and child health outcomes; and environmental exposome and cognitive decline and brain MRI patterns. He has studied heavy metals, persistent organic pollutants, endocrine disrupting chemicals, and chemical mixtures. He is Associate Editor of International Journal of Hygiene and Environmental Health (IJHEH) and on the Editorial Review Board of Environmental Health Perspectives (EHP). He has served on Environmental Protection Agency (EPA) Science Advisory Board.

Corey McMillan, PhD

Associate Professor of Neurology, University of Pennsylvania

Corey McMillan, PhD is an Associate Professor of Neurology at the University of Pennsylvania (Penn) and Co-Director of the Penn Frontotemporal Degeneration Center. He is also affiliated with several research centers at Penn including Penn Neurodegeneration Genomics Center, Population Aging Research Center, and Institute for Biomedical Informatics. His research program focuses on age-associated neurodegenerative conditions including frontotemporal degeneration (FTD) and amyotrophic lateral sclerosis (ALS) that share neuropathological and genetic features but present with a range of clinical syndromes and primary age-related tauopathy (PART) and Alzheimer's disease (AD) that share tau pathology along a spectrum of severity. By testing biologically-grounded hypotheses with novel analytic and multimodal approaches, his lab integrates neuroimaging modalities (e.g., MRI, DTI) with genomics (e.g., SNP genotypes, RNA-seq, DNA methylation) to address the biological basis of clinical heterogeneity in neurodegenerative disease.

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Edward B. Lee, MD, PhD

Associate Professor of Pathology and Laboratory Medicine, University of Pennsylvania

Edward B. Lee, M.D., Ph.D., graduated Phi Beta Kappa from Stanford and earned his M.D. and Ph.D. from the University of Pennsylvania. After training in Anatomic Pathology and Neuropathology, he became an Assistant and then Associate Professor in the Department of Pathology and Laboratory Medicine, where he is now Co-Director of the Institute on Aging, Associate Director of the Penn Alzheimer's Disease Research Center, Director of the Center for Neurodegenerative Disease Research Brain Bank and principal investigator of the Translational Neuropathology Research Laboratory (TNRL), which investigates Alzheimer's disease, neurodegenerative diseases, and trauma-related brain injuries. He has made significant contributions to understanding aging-related diseases, including the discovery of vacuolar tauopathy linked to VCP mutations and the development of cryo-electron tomography to study human brain tissue. Edward is also an attending physician at the Hospital of the University of Pennsylvania, specializing in diagnostic neuropathology. With over 250 publications in top journals and an h-index of 71, he has received numerous NIH grants and awards including a Clinical Scientist Development Award from the Doris Duke Charitable Foundation.

Edward serves on multiple NIH and DoD study sections and editorial boards for prominent journals. He is dedicated to training future scientists, serving on around 50 thesis committees and directing a national workshop for neuropathology trainees. His vision is to foster interdisciplinary collaboration to better understand aging and develop new therapies for aging-related diseases.

Holly Elser, MD, PhD, MPH

Neurology Resident, Hospital of the University of Pennsylvania

Holly Elser, MD, PhD, MPH is a neurology resident at the Hospital of the University of Pennsylvania. She competed her MD at Stanford University School of Medicine. She earned her Master's of Public Health (MPH) and PhD at the UC Berkeley School of Public Health, where her research focused on the health implications of occupational exposures and working environments. Her work more recently has focused on the implications of common environmental exposures for neuropsychiatric disease onset and worsening. Her recent work on wildfire smoke exposure and dementia has been featured in The Los Angeles Times, Bloomberg News, and CNN. Dr. Elser is also an Early-Stage Investigator in the Center of Excellence in Environmental Toxicology (CEET).

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Andrea Schneider, MD, PhD

Assistant Professor of Neurology, University of Pennsylvania

Andrea Schneider, MD, PhD is an Assistant Professor of Neurology in the Division of Neurocritical Care with a secondary appointment in the Department of Biostatistics, Epidemiology, and Informatics at the University of Pennsylvania Perelman School of Medicine. She received her MD in 2014 from the Johns Hopkins University School of Medicine and received her PhD in Epidemiology from the Johns Hopkins University Bloomberg School of Public Health in 2012. She completed Neurology Residency and Neurocritical Care Fellowship at Johns Hopkins Hospital in 2020. She is a neuroepidemiologist who has authored over 130 peer-reviewed publications. Her research program is centered on traumatic brain injury (TBI) epidemiology and the prevention of TBI-related sequelae, with a focus on the prevention of TBI-related neurodegeneration and dementia. Dr. Schneider is the PI of a NINDS K23 grant and three Department of Defense grants. She is the recipient of the 2023 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science from the American Neurological Association and the 2023 Rising Star Award from the National Neurotrauma Society.

Yeong Shin Yim, PhD

Assistant Professor of Pharmacology, University of Pennsylvania

Dr. Yim's research focuses on the interaction between the central nervous system (CNS) and the immune system under homeostatic conditions. Her work explores how these systems communicate and influence each other, with a particular emphasis on how immune system responses to environmental stimuli can affect brain function. Dr. Yim applies this knowledge to various disease contexts, investigating how disruptions in this interplay contribute to neurological and immune-related disorders. Dr. Yim is also an Early-Stage Investigator in the Center of Excellence in Environmental Toxicology (CEET).

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Victoria Johnson, MBCHB, PhD

Assistant Professor of Neurosurgery, University of Pennsylvania

Dr. Victoria E. Johnson is an Assistant Professor in the Penn Center for Brain Injury and Repair and the Dept. of Neurosurgery at the Perelman School of Medicine, University of Pennsylvania. Dr. Johnson received her medical degree and Ph.D. from the University of Glasgow, UK, before going on to complete a post-doctoral fellowship at the University of Pennsylvania. Her research interests include the biomechanical mechanisms and evolving neuropatholgical changes following traumatic brain injury (TBI), including concussion, and with a focus on diffuse brain pathologies. By studying both in vivo models and human post-mortem tissue, Dr. Johnson and colleagues have explored the potential neuropathological links between TBI and neurodegeneration.

Sigrid Veasey, MD

Professor of Medicine, University of Pennsylvania

Dr. Veasey is a Professor of Medicine, physician-scientist, here at Penn. Her laboratory focuses on identifying the molecular mechanisms underlying neural injury in sleep disorders and sleep disruption. Currently, a major emphasis her lab is understanding the molecular mechanisms by which sleep disruption induces irreversible neural injury including on some regions neurodegeneration. Previously sleep researchers believed that all neurobehavioral consequences of sleep loss were fully reversible upon recovery sleep. More recent work in humans shows recovery of some tasks is far more protracted. Dr. Veasey's lab has led the way in discovering that chronic short sleep and sleep fragmentation, which are common occurrences in modern society, particularly in disadvantaged neighborhoods, induce loss of wake-activated neurons, neurons essential for alertness and optimal cognitive performance. Most recently her lab has discovered that chronic sleep loss incites an amyloid cascade within locus coeruleus neurons and that this cascade leads to an unstoppable progression of tau degeneration marching throughout the forebrain and that activation of a lysosomal peptidase, asparaginyl endopeptidase is activated by sleep loss in locus coeruleus neurons and contributes to sleep loss changes in amyloid and tau and glial responses. It is hoped that identification of these molecular pathways of injury in murine models will pave the way for therapeutic strategies to prevent sleep disruption neural injury.

Dr. Veasey also leads the Thematic Area in Environmental Neuroscience in the Center of Excellence in Environmental Toxicology (CEET).

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About the Institute on Aging

The mission of the Institute on Aging (IOA) at the University of Pennsylvania is to improve the health of older adults by increasing the quality and quantity of clinical and basic research as well as educational programs focusing on normal aging and aging-related diseases across the entire Penn campus.

David Wolk, MD
Co-Director

Edward B. Lee, MD, PhD
Co-Director

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About the Center of Excellence in Environmental Toxicology

The mission of the Center of Excellence in Environmental Toxicology (CEET) is to elucidate the mechanistic links between environmental exposures and human disease and translate findings into action to improve the health of vulnerable individuals, and local, national, and global communities. CEET is funded in part by NIEHS under award number P30 ES013508.

Trevor M. Penning, PhD
Director

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