Title: "Outdoor Air Pollution, Alzheimer's Disease, and Related Dementias: *What Have We Learned from the Epidemiologic and Animal Studies?*"

Jiu-Chiuan (J.C.) Chen, M.D., MPH, Sc.D.
Co-Director, Data Core, Alzheimer's Disease Research Center, Keck School of Medicine;
Co-Director, Center on Urban Air Pollution and Alzheimer's Disease, Davis School of Gerontology;
Founding Director, Environmental Neurosciences and Population Health Program, University of Southern California

Abstract:
An increasing number of epidemiologic studies have reported the associations of cognitive decline and increased risks for Alzheimer's disease and related dementias (ADRD) with late-life exposures to ambient air pollutants, especially the fine particulate matter (PM$_{2.5}$: particulate matter with aerodynamic diameters <2.5 am). This new wave of air pollution epidemiologic data started with earlier analyses of ecological data in Mexico and others using the electronic medical records in Taiwan, all with methodological limitations in assessing exposures and outcomes. However, the epidemiologic associations are substantiated by more recent studies conducted in well-characterized community-based cohorts with better exposure assessment. Over the last few years, Dr. Chen has been leading several NIH-funded studies, aiming to strengthen the causal link between ambient air pollution and pathological brain aging along the ADRD continuum. In this lecture, Dr. Chen will demonstrate a team-science approach that integrates the clinical neurosciences and population neuroinformatics to investigate how air pollution exposure alters the brain structures with gray matter atrophies in areas vulnerable to AD neuropathology. He will also show how long-term air pollution exposures in late life accelerate the early neuropsychological processes and contribute to the heterogeneity in the trajectories of cognitive decline during the preclinical stage, likely independent of cerebrovascular damage. In the 2020 report of Lancet Commission on Dementia Prevention, Intervention and Care, exposure to outdoor air pollution was added to the short list of late-life risk factors. Dr. Chen will discuss the implications for population-wide and individual-levels approaches to ADRD prevention, to help the clinical and neuroscience communities better appreciate these neuroscience data on air pollution neurotoxicity. Towards the end of his presentation, Dr. Chen will share his thoughts about the current knowledge gaps and what a multidisciplinary team of clinical and academic scholars can work together to advance the environmental neurosciences of outdoor air pollution and brain aging.