**Mechanical and Aeronautical Engineering**

**Seminar**

**Prof. Anthony S. Wexler**

Director, Air Quality Research Center and Distinguished Professor, Departments of Mechanical and Aerospace Engineering, Civil and Environmental Engineering, and Land, Air and Water Resources

**University of California, Davis**

Will present a talk titled:

**Near Roadway NeuroToxicology**

**Abstract**

Numerous epidemiological studies have shown that families living near heavily trafficked roadways have higher incidence of a range of neurological diseases including Alzheimer’s Disease and disease related to neurodevelopmental disruption, such as Autism Spectrum Disorder and Attention-Deficit/Hyperactivity Disorder. Questions remain as to the reasons for this association. Is it due to Traffic-Related Air Pollution (TRAP), socioeconomic factors, or stress related to noise or vibration? To address these questions, we built a vivarium near a heavily trafficked tunnel in northern California. Air is drawn from the tunnel into the vivarium where rats breathe the tunnel air in real time. The tunnel naturally concentrates the pollutants simulating near-roadway exposure. Two experiments have been performed so far. The first explored neurodevelopment. Rats were exposed to TRAP or filtered air (FA) from gestational day 15 to postnatal day 50, during which they were behaviorally tested. Following exposure, brains were analyzed for markers of neurodevelopmental disruption, including microglial infiltration, reactive astrogliosis, and neurogenesis using immunohistochemistry, and ventricular volume using magnetic resonance imaging. The second explored Alzheimer’s disease. We exposed male and female TgF344-AD rats and congenic controls to real-time TRAP or filtered air (FA) over the course of 15 months. At 3, 6, 10, and 15 months of age, the animals were behaviourally tested and brain samples were collected from a cohort and analyzed for plaque burden, bioactive lipids, microgliosis, astrogliosis, and cytokine protein levels. This talk will describe the exposure facility, the characteristics of the air pollution and present preliminary results related to health endpoints.

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**Bio**

Dr. Wexler obtained his BS from UC Berkeley in Engineering Physics in 1976, SM in Mechanical Engineering from MIT in 1978, and PhD from Caltech in Mechanical Engineering in 1990. His research interests center on air pollutants, their concentration and dynamics in the atmosphere in both the gas and particle phases, and their health effects. Currently, he is director of the Air Quality Research Center and Distinguished Professor of Mechanical and Aerospace Engineering, Civil and Environmental Engineering, and Land, Air and Water Resources at the University of California Davis. He has published over 200 peer reviewed papers in his career that are cited about 500 times per year.

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**CAMP 176**

**Time: 2:30 PM**