

**CEE Seminar Speaker****ELIZABETH DEFRANCE**PhD Student  
Department of Chemical and Environmental Sciences  
UC Riverside**APRIL 25TH, 2025 11:00 A.M. - 12:00 P.M. IN WCH 205/206****BRAKE-WEAR AND TIRE-WEAR EMISSION MEASUREMENTS AND  
CHARACTERIZATION FOR LIGHT DUTY VEHICLES DURING CHASSIS DYNAMOMETER  
AND ON-ROAD TESTING**

The topic of non-exhaust emissions has received increased attention over recent years due to the continuous reduction of combustion-generated (tailpipe) emissions from mobile sources. These emissions can lead to the degradation of local and regional air quality and affect the health and wellbeing of communities living near major roadways and freight corridors. Non-exhaust emissions are also unregulated at this point because of the lacking research in the field. Current emission regulatory efforts are focusing on reducing particulate non-exhaust emissions that originate from the wear of brakes and tires. This research is supported by two major CARB funded projects to develop measurement protocols for brake and tire wear particulate and gaseous emissions from vehicles. The findings of this work will be instrumental in better informing current emission inventories and in future rule development for non-exhaust emissions. This work emphasizes the evaluation of the chemical, physical, and toxicological properties of particulate emissions using advanced on-line and off-line instrumentation, as well as the evaluation of tire wear gaseous emissions. Understanding exactly what is being emitted from non-exhaust sources such as tires and brakes is instrumental in being able to regulate these sources and show the need for new vehicle technology. Separate sampling systems have been designed to measure tire-wear and brake-wear emissions from vehicles operating in the laboratory over different driving cycles and operating in on-road real world driving. The sampling system is being created with the goal that it is applicable to all types of vehicles, electric and conventional, creating a simple measurement protocol for evaluating non-exhaust emissions for all vehicles. This work encompasses the effect of driving dynamics, type of road pavement, brake pad material, and effect of tire quality on tire- wear emissions from vehicles.

**BIOGRAPHY**

Elizabeth is a second-year PhD student under the guidance of Dr. Georgios Karavalakis in Chemical and Environmental Engineering at the University of California, Riverside. Her research focuses on the measurement and understanding of brake-wear and tire-wear from mobile sources, particularly on novel sampling systems for on-road testing of particulate and gaseous emissions. She has also worked on lithium battery fire emission measurements and marine emissions testing. Her work has been supported by multiple organizations including the National Center for Sustainable Transportation (NCST) and California Air Resources Board (CARB).