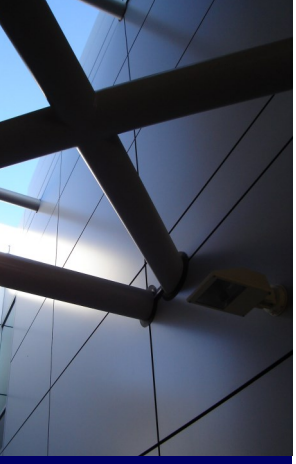

MECHANICAL ENGINEERING
THESIS DEFENSE

The Department of Mechanical Engineering presents:

The Master's Thesis Defense of

Wei-Zin (Peter) Ho

Tuesday, November 30, 2021, 2PM PST

Master of Science, Graduate Program in Mechanical Engineering
University of California, Riverside, November 2021
Dr. Heejung Jung & Dr. Georgios Karavalakis , Co-Chairs

Air Quality Benefits from Alternative Fuel Vehicles: Ammonia and Nitrous Oxide Emissions from a Fleet of Ethanol Fueled Vehicles and Real-World Emissions from Diesel and Natural Gas-Powered Street-Sweepers

Abstract: Internal combustion engines (ICEs) continue to be a major contributor to air pollution. Emissions from ICEs play a big role in climate change and cause significant human and environmental problems due to both regulated and non-regulated tailpipe emissions. This has prompted the United States Environmental Protection Agency (EPA) to raise the emissions standards for ICEs causing engine manufactures to develop engines more efficient in reducing emissions. These EPA regulations have led some to transition from standard fossil fuels (gasoline and diesel) to alternative fuels and to raise the standard of emissions control technologies. The alternative fuels in this study include ethanol blends and compressed natural gas (CNG). Emissions technology of interest will include selective reduction catalyst (SCR), diesel oxidation catalyst (DOC), diesel particulate filter (DPF), and three-way catalyst (TWC). With the increasing fleet of vehicles on the road, some non-regulated emissions have become emissions of relevance as some are precursors in the formation of harmful secondary particulate matter (PM).

This study will investigate regulated emissions from CNG and diesel street sweepers in the South Coast Air Basin. Second, this study will investigate the non-regulated emissions of ammonia (NH3) and nitrous oxide (N2O) in the present fleet of light-duty passenger vehicles (2016-2021) fueled with 10% ethanol blend (E10) and 15% ethanol blend (E15).