

## Spring 2018 Seminar Series

### Impacts of Urban Design and Electric Vehicles on Future Air Quality and Exposures

**FRIDAY FEBRUARY 23, 2018**

2:00 PM EST – HEC 356

'Smart' urban growth and electric vehicles are potential solutions to the negative impacts of worldwide urbanization on air pollution and health. However, the effects of planning strategies on distinct types of pollutants, and on human exposures, remain understudied. Here, we quantified the impacts of alternative urban designs for the area around Tampa, Florida USA, on emissions, ambient concentrations, and exposures to oxides of nitrogen (NO<sub>x</sub>), 1,3-butadiene, and benzene. We studied three potential future scenarios: sprawling growth, compact growth, and 100% vehicle fleet electrification. We projected emissions in the seven-county region to 2050 based on One Bay regional visioning plan data. We estimated pollutant concentrations in the county that contains Tampa using the CALPUFF dispersion model. We applied residential population projections to forecast acute (highest hour) and chronic (annual average) exposure. The compact scenario was projected to result in lower regional emissions of all pollutants than sprawl. Within Hillsborough County, the compact form also had lower emissions, concentrations, and exposures than sprawl for NO<sub>x</sub>, but higher exposures for butadiene and benzene. The addition of complete vehicle fleet electrification to the compact scenario mitigated these in-county increases for the latter pollutants, lowering predicted exposures to butadiene and benzene, but also resulted in higher exposures to NO<sub>x</sub> due to increased demand on power plants. These results suggest the importance of considering multiple pollutants and human exposures during study and design of urban growth.

### Dr. Haofei Yu

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Haofei Yu earned his Ph.D. degree in Environmental Health from USF and a M.S. degree in Environmental Engineering from University of Shanghai for Science and Technology in China. He currently works as an assistant professor in Department of Civil, Environmental and Construction Engineering of the University of Central Florida, following his post-doc positions at Pacific Northwest National Laboratory (PNNL) and Georgia Institute of Technology. Haofei Yu's research interests mainly focus on air pollutant emissions estimation, air quality modeling and pollution exposure assessment. He has received several scholarships and awards in the past few years for his research work, including Outstanding Performance Award from PNNL, Sam Bell Endowed Scholarship and Axel Hendrickson Scholarship from USF, and Sustainability Research Scholarship from the Air and Waste Management Association (AWMA). While he was at USF, he also founded the official AWMA USF Chapter and served as its first president.