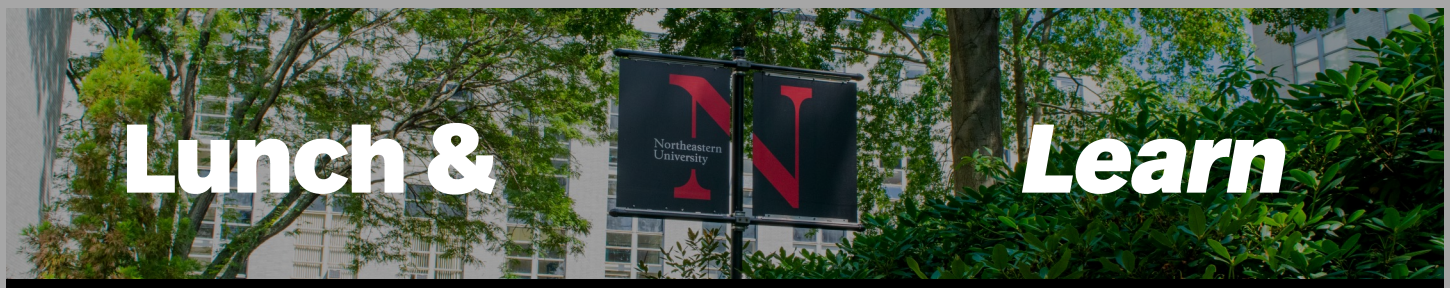

A new Bimonthly seminar series from the Department of Civil and Environmental Engineering (CEE), focusing on convergent research, bringing together Northeastern colleagues and collaborators to think big/bold, explore ideas that build cooperation and foster transformative innovation within CEE and across disciplines beyond CEE.

Urban-scale Measurements and Modeling Fate & Transport of PFAS Across Media

Per- and Polyfluoroalkyl Substances (PFAS) have gained attention due to their adverse health effects as well as unknown exposures to legacy and novel compounds. As many of these compounds are stable and persistent, many PFAS compounds have been detected worldwide across different media in the total environment. Thus, comprehensive multi-media PFAS chemical concentration data are needed to study PFAS human exposure and health impacts. While some PFAS measurements and exposure studies are available, no comprehensive PFAS measurement data exist at continental scale. Also, it is not clear to the local and federal government agencies as to how to account for the spatiotemporal distributions of PFAS contamination and associated long-term health impacts. Such issues are acute at local to urban scales. Thus, the in-depth understanding of fate and transport of PFAS across media is much needed and may provide critical information for stakeholders.

Kiran Alapaty, *Senior Science Advisor in the Atmospheric & Environmental Systems Modeling Division , EPA*

Friday

May 7th, 2021

12pm–1pm EST

Teams Meeting

The Washington Works plant in Parkersburg, West Virginia has emitted long-chain perfluorooctanoic acid (PFOA) into the environment for decades and at present it continues to emit hexafluoropropylene oxide dimer acid [(HFPO-DA), GenX]. A database for PFOA at Parkersburg was developed and these PFOA measurements in air, water, and soil provide a good opportunity to validate the multi-media modeling system.

We are tailoring a robust and efficient suite of modeling tools to simulate PFAS fate and transport in air, water, and soil at urban scales. For air, a state-of-the-art dispersion model (QUIC) is being tested for PFAS air modeling. For other media, we are testing two state-of-the-art USGS models (MODFLOW and MT3D) for groundwater, the BreZo model for surface water, and EPA's model PRZM-5 for vadose zone. These modeling tools can be used at seasonal to decadal timescales, and their PFOA estimations can be provided as input data to a high throughput physiologically based pharmacokinetic (PBPK) model to estimate human exposure to PFAS. The combination of multi-media modeling system and PBPK model bridges the gaps between PFAS emissions and human exposure estimates, and thus can provide the basis for epidemiological studies. This research opens doors to study the association between human exposure to PFAS and specific human diseases.

Bio: *Kiran Alapaty is the Senior Science Advisor in the Atmospheric & Environmental Systems Modeling Division in the ORD of US EPA. His research interests are in air quality modeling and model development, PFAS life cycle modelling, integrated assessment modeling, convective cloud parameterization development, boundary layer modeling, climate change and exposure science, and socio-economics. In the past, he was the Chief of the Climate Branch of the AMA Division with research interests in improving reginal climate data for use with exposure science research.*
Before joining EPA in 2011, for several years Kiran was at DOE HQ as a Program Director for the DOE's national climate program managing DOE's National Labs and research grants. Prior to that, he was also a Program Director at the National Science Foundation managing climate research at NCAR and academia.