Lunch & Learn

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.

Matthew J. Alvarado *Vice President, Research and Development Division, AER*

Friday

February 12, 2021

12pm–1pm

Teams Meeting

Smoke, Satellites, and Storage Bins:

AER's Research in Air Quality and Greenhouse Gases

This talk will discuss three topics from AER's recent and on-going research into air quality and greenhouse gases. First we will discuss the efforts at AER to improve our ability to model the impacts of biomass burning on ozone and PM2.5, with a focus on the chemistry that takes place within the smoke after emission. We will then discuss the use of satellite observations in air quality studies and monitoring, including work at AER to better constrain sources of ammonia, carbon dioxide, and methane. Finally, we will discuss a recent consulting project where we looked into the physics and chemistry of smoke from fires at eclectic storage facilities and made recommendations for how to model the impacts for planning and emergency response purposes. We will also discuss how AER has partnered with universities, national labs, and other organizations in pursuing these research topics.

BIO: Dr. Alvarado leads AER's Research and Development Division, responsible for scientific research and technology development in the areas of atmospheric composition, air quality, radiation / radiative transfer, satellite remote sensing and retrievals, numerical weather prediction, data assimilation, physical oceanography, climate science, cloud microphysics, and seasonal forecasting. The R&D Division also develops decision aids for government, non-profit, and commercial customers and supports government environmental R&D and operations.

His research experience includes atmospheric chemistry and air quality modeling with a specific focus on the chemistry of smoke plumes from biomass burning and their impact on atmospheric composition, air quality, and climate. He also performs research on radiative transfer modeling, including the interaction of atmospheric aerosols and trace gases with radiation and the optimal estimation of trace gas concentrations and aerosol properties using satellite-, aircraft-, and ground-based radiance observations.

He has led numerous successful research efforts as a principal investigator for government, non-profit, and industry clients. He has authored and co-authored dozens of articles in peer-reviewed scientific journals and over 100 conference presentations. Dr. Alvarado is a member of the American Geophysical Union, the American Meteorological Society, the American Chemical Society, and the American Association for Aerosol Research. He earned his Ph.D. in climate physics and chemistry and his B.S. in chemical engineering from the Massachusetts Institute of Technology (MIT).