

DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE
SEMINAR SERIES
FALL 2022

WEDNESDAY, NOVEMBER 30, 2022
TIERNAN HALL – LECT. HALL 1
1:00PM-2:20PM

GUEST SPEAKER

Luis Lim, Chief, Bureau of Air Monitoring, NJDEP
Joshua Ray, Research Scientist, Bureau of Air Monitoring, NJDEP
Trenton, NJ

TOPIC

Hourly Measurement of Volatile Organic Compounds in Ambient Air by Automated GC-FID at the NJDEP Air Monitoring Station in Rutgers University

ABSTRACT

Most ground-level ozone (O₃) is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) react in the presence of sunlight. The Photochemical Assessment Monitoring Stations (PAMS) network was established by the U.S. Environmental Protection Agency (USEPA) to measure these ozone-forming pollutants, also known as precursor pollutants. Data from the PAMS network is used to better characterize the nature and extent of the ozone problem, track VOC and NO_x emissions, assess air quality trends, and make planning decisions. The PAMS station in New Jersey is on Rutgers University agricultural land in East Brunswick.

The PAMS station monitors ozone, nitric oxide (NO), nitrogen dioxide (NO₂), total reactive oxides of nitrogen (NO_y), and specific VOCs, including several that are carbonyls and are important in ozone formation. In addition, the measurement of specific weather parameters is required at all PAMS: wind speed and direction; temperature; barometric pressure; relative humidity; precipitation; solar radiation; UV radiation; and mixing layer height. The VOC and carbonyl measurements are taken only during peak ozone season, from June 1st to August 31st each year.

In 2015, USEPA revised the National Ambient Air Quality Standard (NAAQS) for ozone, including the requirements for monitoring. To support the implementation of the revisions, USEPA designated specific instruments for the continuous hourly measurement of ozone precursor VOCs, provided funding to the states for purchasing the equipment, and set a date of June 1, 2021, to begin monitoring using the approved instruments. For the continuous hourly measurement of VOCs, New Jersey uses the Markes-Agilent system, which electrically cools and freezes humidified air, allowing the detection of more polar compounds, and the reporting of concentrations of both alpha and beta pinenes.

BIO

Luis Lim is the Chief for the Bureau of Air Monitoring at the New Jersey Department of Environmental Protection (NJDEP). Luis graduated with a B.S. in Chemical Engineering from Lehigh University in Bethlehem, PA and began his career with the NJDEP in the Bureau of Air Monitoring. In his 35 years with Air Monitoring, Luis has

worked on quality assurance planning, equipment testing, site installation, data validation, data acquisition system implementation, network assessments, operator training and community science.

Joshua Ray is a Research Scientist for the Bureau of Air Monitoring at the New Jersey Department of Environmental Protection (NDJEP). Joshua graduated with a B.S. in Environmental Science from West Virginia Wesleyan college where he studied the chemistry of acid mine drainage, and received a M.S. in Environmental Science from Drexel university studying atmospheric chemistry. Joshua has worked in the Bureau of Air Monitoring for 19 years in many capacities: maintaining and operating particulate and ambient gas samplers at air monitoring stations, developing the audit and calibration procedures for the particulate network, and serving as the primary operator of the PAMS station over the past 5 years.

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