University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

9:45 a.m. Tuesday, January 25 • 331 Smith Hall

Postdoctoral Fellow

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Chemistry of Atmospheric Aerosols: Instrument Development, Aircraft Measurements, and Modeling

Abstract

Atmospheric aerosols, or particles, strongly influence the energy balance of the Earth and the hydrological cycle by scattering and absorbing radiation and serving as condensation sites for the formation of cloud droplets and ice crystals. However, analytical challenges exist in the measurement of the chemistry of atmospheric aerosols, which exist as dynamic, complex mixtures. During transport, particles can accumulate secondary organic aerosol from oxidized volatile organic compounds or undergo heterogeneous reactions with trace gases, for example. An aerosol time-of-flight mass spectrometer was developed for aircraft-based measurements of individual atmospheric particles in real-time. Instrument development will be briefly discussed, as well as results from the first aircraft-based deployment of the aircraft aerosol time-of-flight mass spectrometer. In-situ measurements of atmospheric particles provided vertical profiles of particle chemistry, the results of which impact climate modeling. Measurement of biological particles and mineral dust within cloud ice crystals provided new insights into cloud ice formation. Lastly, one-dimensional modeling of the oxidation of biogenic volatile organic compounds will be discussed as a method to simulate vertical profiles of secondary organic aerosol formation above a forest.

Host: Professor Christopher Cramer
Refreshments will be served prior to the seminar.