Research interests

We study the physical and chemical properties of aerosols using single particle mass spectrometry and optical trapping approaches. Aerosols are relevant to a wide range of applications, from climate to health to materials science, so our work is by nature highly interdisciplinary. We develop our own instruments to tackle important questions about aerosol processes and properties. Current research interests include resolving the factors that govern photoinitiated chemistry in aerosols, quantifying the surface composition of picolitre volume droplets, and elucidating the growth mechanisms of engineered nanoparticles.

Employment

NERC Research Fellow
School of Chemistry
Faculty of Science
United Kingdom
1 Sep 2017 → present

Cabot Institute for the Environment
Institutes
United Kingdom
4 Aug 2014 → present

EPA STAR Graduate Fellow
Department of Chemistry and Biochemistry, University of Delaware
Newark, DE 19716, United States
1 Sep 2011 → 1 Aug 2014

ACS Division of Analytical Chemistry Graduate Fellow
Department of Chemistry and Biochemistry, University of Delaware
Newark, DE 19716, United States
1 Jun 2011 → 1 Sep 2011

Center For Critical Zone Research Graduate Fellow
Department of Chemistry and Biochemistry, University of Delaware
Newark, DE 19716, United States
1 Aug 2008 → 1 Jun 2011

Research output

Evaluation of the comparative risk of aerosol generation by tracheal intubation and extubation in the operating theatre

Open questions on the physical chemistry of aerosols
The Surface Tension of Surfactant-Containing, Finite Volume Droplets

Surface Tensions of Picoliter Droplets with Sub-Millisecond Surface Age

Vibrational Spectroscopy of Individual Aerosol Droplets by Optical Tweezers

Accuracy Required in Measurements of Refractive Index and Hygroscopic Response to Reduce Uncertainties in Estimates of Aerosol Radiative Forcing Efficiency

Aerosol microphysics: from molecules to the chemical physics of aerosols

Mechanisms of Atmospherically Relevant Cluster Growth

Accurate representations of the physicochemical properties of atmospheric aerosols: when are laboratory measurements of value?

A complete parameterisation of the relative humidity and wavelength dependence of the refractive index of hygroscopic inorganic aerosol particles

Coalescence Sampling and Analysis of Aerosols using Aerosol Optical Tweezers

A Statistical Thermodynamic Model for Surface Tension of Organic and Inorganic Aqueous Mixtures

Measurements and Predictions of Binary Component Aerosol Particle Viscosity

Dynamic measurements and simulations of airborne picolitre-droplet coalescence in holographic optical tweezers

Precise, contactless measurements of the surface tension of picolitre aerosol droplets

Silicon is a frequent component of atmospheric nanoparticles
Amine exchange into ammonium bisulfate and ammonium nitrate nuclei

Polarized ATR-FTIR investigation of Fe reduction in the uley nontronites

Awards