

Adam Ahern, Ph.D.

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Summary

I'm passionate about analyzing the dynamics of aerosols using cutting-edge aerosol instrumentation. Although aerosols are very small in size, they are ubiquitous and numerous, and therefore have dramatic implications for human health and climate. Their small size also means they have unique properties that must be characterized using specialized instrumentation. My current work uses field measurements of aerosol optical properties to improve the ability of satellites to count particles 1/100th the size of a human hair from space.

Relevant Skills

- +11 years air quality experience with a focus on research-grade instrumentation
- Independent research
- Creative and insightful analysis of complex data from multiple methods/instruments
- Technical writing experience
- Effective presentation of technical material
- Extensive internal and external collaboration
- Extensive experience in aerosol characterization (gas and particle phases; single particle and ensemble; chemical, physical, and optical)
- Experience in lab aerosol experimentation (smog chamber, photo-oxidation reactors, and flow tubes)
- Multiple field deployments (international and domestic; airborne and ground-based.)

Education

Carnegie Mellon University

Doctor of Philosophy, Department of Chemistry

Co-advisors: Neil M. Donahue and Ryan C. Sullivan

Thesis: Atmospheric aging of biomass-burning aerosols:

Oxidants, Oxidation Products, and Measurement Methods

2011-2017

Boston College

Bachelor of Science, Department of Chemistry

Advisor: Paul Davidovits

2005-2009

Professional Experience

Cooperative Institute for Research in Environmental Sciences, Univ. of Colorado, Boulder (2018-Present)

Research Scientist I

- Contracted by NOAA's Chemical Sciences Laboratory for participation in FIREX-AQ field mission.
- Redesigned and built a dual-wavelength polarizing nephelometer for airborne measurements.
- Supported a suite of aerosol optical measurements as part of a joint venture NASA/NOAA six month field project.
- Leading analysis, publication, and presentation of dual-wavelength scattering phase function measurements from the Laser Imaging Nephelometer.

PPG Industries Inc., Pittsburgh, PA (2017-2018)

Research Chemist I

- Developed and validated methods for measuring gas-phase emissions to better understand fundamental coating processes and develop low-VOC products and processes using GC-MS.

- Lead efforts to improve beverage coatings by analyzing volatile flavorant compounds using solid phase micro extraction (SPME).
- Synthesized and communicated technical results to both research scientists and managers to facilitate effective decision making.

Carnegie Mellon University, Center for Atmospheric Particle Studies, Pittsburgh, PA (2011- 2017)

Ph.D. candidate and lab manager

- Served as laboratory manager and mass spectrometry expert and technician.
- Published work regarding quantitative ability two commercial mass spectrometers for characterizing soot particles coated with atmospherically relevant organics.
- Designed, built, and benchmarked replacement laser light source for particle detection system of a single particle mass spectrometer.
- Managed multiple projects with different completion timescales simultaneously while coordinating with collaborators.
- Collaborated with external and internal research groups to maximize output from research efforts: anticipating three publications from FLAME-IV biomass burning campaign, three publications from cook stove emissions campaign, and two publications from University of Washington collaboration regarding ClNO₂ formation.
- Laboratory teaching assistant – rated 4.84/5.00 by students (Department average of 4.50/5.00.)
- Trained undergraduate students in chemical analysis techniques including HPLC and basic lab techniques.

Aerodyne Research, Inc., Billerica, MA (2009- 2010)

Research Technician

- Characterized photo-oxidation flow reactors in collaboration with University of Toronto.
- Measured aerosol hygroscopic growth factor and CCN activity comparison in collaboration with Kuopio U., Finland and U. of Helsinki, Finland.

Boston College, Department of Chemistry, Boston, MA (2008- 2009)

Undergraduate Research Fellow

- Deployed a prototype thermal adsorption gas chromatograph (TAG-GC) for six weeks during the EUCAARI field campaign, San Pietro Capiofume, Italy.
- Developed data analysis software and graphical user interface for GC-MS using Igor Pro.
- Optimized and characterized to the operation of soot particle source that was the crux of Boston College Black Carbon Instrument Inter-Comparison Experiments resulting in four publications

Select Peer-reviewed Publications (5/14 total)

1. **Ahern, A.T.**, L. Goldberger, L. Jahl, J. Thornton, and R.C. Sullivan. “Production of N₂O₅ and ClNO₂ through Nocturnal Processing of Biomass-Burning Aerosol.” (2017) *Environmental Science and Technology*.
2. **Ahern, A.T.**, R. Subramanian, G. Saliba, A.L. Robinson, N.M. Donahue, and R.C. Sullivan. “Effect of secondary organic aerosol coating thickness on the real-time detection and characterization of biomass burning soot by particle mass spectrometry.” (2016) *Atmospheric Measurement Techniques*.
3. Tkacik, D. S., E.S. Robinson, **A.T. Ahern**, R. Saleh, C. Stockwell, P. Veres, I.J. Simpson, S. Meinardi, D.R. Blake, R.J. Yokelson, A.A. Presto, R.C. Sullivan, N.M. Donahue, and A.L. Robinson. “A dual-chamber method for quantifying the effects of atmospheric perturbations on secondary organic aerosol formation from biomass burning emissions.” (2017) *Journal of Geophysical Research Atmospheres*.
4. Lambe, A.T., **A.T. Ahern**, J.P. Wright, D.R. Croasdale, P. Davidovits, T.B. Onasch. “Oxidative aging and cloud condensation nuclei activation of laboratory combustion soot.” (2015) *Journal of Aerosol Science*.

5. Saleh, R., E.S. Robinson, D.S. Tkacik, **A.T. Ahern**, S. Liu, A.C. Aiken, R.C. Sullivan, A.A. Presto, M.K. Dubey, R.J. Yokelson, N.M. Donahue, and A.L. Robinson. "Brownness of organics in aerosols from biomass burning linked to their black carbon content." (2014) *Nature Geoscience*.

Select Conference Presentations (3/6 total)

1. **Ahern, A.T.**, L. Goldberger, L. Jahl, J. Thornton, R.C. Sullivan. "Multiphase chemistry of chlorine from biomass burning." American Chemical Society National Meeting, 2016, Philadelphia, PA. Platform presentation.
2. **Ahern, A.T.**, E.S. Robinson, D.S. Tkacik, R. Saleh, R.J. Yokelson, A.A. Presto, A.L. Robinson, N.M. Donahue, and R.C. Sullivan. "Composition and evolution of biomass burning emissions." International Conference on Carbonaceous Particles in the Atmosphere, 2015, Berkeley, CA. Poster presentation.
3. **Ahern, A.T.**, E.S. Robinson, D.S. Tkacik, R. Saleh, R.J. Yokelson, A.A. Presto, A.L. Robinson, N.M. Donahue, and R.C. Sullivan. "Composition and mixing timescale measurements of biomass-burning aerosol and secondary organic aerosol from α -pinene using two particle mass spectrometers." Association of American Aerosol Researchers, 2014, Portland, OR. **Student Poster Award*

Awards

Lassettre Physical Chemistry Travel Award - 2016 AAAR

Student Poster Award - 2014

Steinbrenner Graduate Research Fellowship - 2013