Ellis Shipley Robinson

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RESEARCH INTERESTS

Applied, collaborative research in air pollution, including exposure assessment, spatial patterns of pollutants, source apportionment, and indoor air quality. Strong focus on the chemical and physical properties of atmospheric aerosols and VOCs. Aerosol and gas measurements, including aerosol mass spec. (AMS), single-particle AMS (SP-AMS), proton-transfer reaction mass spec. (PTR-MS), and scanning mobility particle sizing (SMPS). Low-cost air quality sensors and mobile air pollution sampling, especially in urban areas. Science communication, environmental exposure outreach, and science journalism.

EDUCATION

Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

- Ph.D. in Chemical Engineering — Aug 2009 – Nov 2014
  - Thesis: Mixing and Phase Behavior of Organic Particles
  - Focus: Air quality, atmospheric science, aerosol instrumentation and measurements.
  - Advisor: Professor Neil M. Donahue
  - Cumulative GPA: 3.87 / 4.0

The Ohio State University, Columbus, Ohio, USA

- B.S. in Chemical & Biomolecular Engineering — Sep 2004 – Aug 2009
  - Graduated with College Honors.
  - Cumulative GPA: 3.712 / 4.00

PROFESSIONAL EXPERIENCE

Johns Hopkins University, Department of Environmental Health & Engineering

- Job title: Research Engineer — Aug 2022 – present
  - Supervisor: Professor Pete DeCarlo

Johns Hopkins University, Department of Environmental Health & Engineering

- Job title: Postdoctoral Researcher — Jun 2020 – Aug 2022
  - Focus: Atmospheric aerosol measurements, data analysis, and large-scale collaborative field work.
  - Supervisor: Professor Pete DeCarlo

Carnegie Mellon University, College of Engineering

- Job title: Communications Manager, Energy and Environment — May 2019 – Apr 2020
  - Focus: Writing about energy and climate-related research from the Colleged of Engineering.
  - Similar job titles: Public information officer (PIO), Research Science Writer.

Carnegie Mellon University, Mechanical Engineering

- Job title: Postdoctoral Researcher — Aug 2016 – May 2019
  - Focus: Geospatial data analysis, statistical data analysis, urban air pollution source characterization.
  - Supervisors: Professor Albert Presto and Professor Allen Robinson

National Oceanic & Atmospheric Association, Chemical Sciences Division

- Job title: Research Scientist I — Jan 2015 – Aug 2016
  - Focus: Biological particle detection, mobile platform-based field measurements.
  - Supervisors: Dr. Anne Perring and Dr. Ru-Shan Gao

JOURNAL ARTICLES:

Click here for Google Scholar profile

IN PREP.

ES Robinson, PF DeCarlo, et al. "Transformation of aerosol components upon outdoor-indoor transport into a residential home in a source-rich urban environment," *in preparation*, Target date: Jan 2023.

ES Robinson, PF DeCarlo, et al. "Three years of seasonal and diurnal patterns of aerosol components measured at an urban field site in Fairbanks, AK (2020 - 2022)," *in preparation*, Target date: Jan 2023.

ES Robinson, PF DeCarlo, "Resolving changes in air pollution in the Northeastern US due to COVID-19 using regulatory monitoring network data," *in preparation*, Target date: Jan 2023.

SUBMITTED

ES Robinson, PF DeCarlo, "Underground natural gas transmission pipeline leak determination through walking survey and soil flux measurements," *submitted*, Dec 2022.

ES Robinson, M Cesler-Maloney, X Tian, J Mao, W Simpson, PF DeCarlo, "Wintertime spatial patterns of particulate matter in Fairbanks, AK during ALPACA 2022," *Accepted, Environmental Science: Atmospheres*.

PUBLISHED

JR Campbell, M Battaglia Jr., K Dingilian, M Cesler-Maloney, JM St. Clair, TF Hanisco, **ES Robinson**, PF DeCarlo, W Simpson, A Nenes, RJ Weber, and J Mao, "Source and Chemistry of Hydroxymethanesulfonate (HMS) in Fairbanks, Alaska," *Environmental Science & Technology*, May 2022.

RHH Janssen, CL Heald, AL Steiner, AE Perring, JA Huffman, **ES Robinson**, CH Twohy, and LD Ziemba, "Drivers of the fungal spore bioaerosol budget: Observational analysis and global modeling," *Atmospheric Chemistry and Physics*, Mar 2021.

RU Shah, **ES Robinson**, P Gu, JS Apte, AL Robinson, and AA Presto, "Socio-economic disparities in exposure to urban restaurant emissions are larger than for traffic," *Environmental Research Letters*, Nov 2020.

N Zimmerman, HZ Li, A Ellis, A Hauryliuk, **ES Robinson**, P Gu, RU Shah, Q Ye, L Snell, R Subramanian, AL Robinson, JS Apte, AA Presto, "Improving Correlations between Land Use and Air Pollutant Concentrations Using Wavelet Analysis: Insights from a Low-cost Sensor Network," *Aerosol and Air Quality Research*, Feb 2020.

Q Ye,HZ Li, P Gu, **ES Robinson**, JS Apte, RC Sullivan, AL Robinson, NM Donahue, AA Presto, "Moving beyond fine particle mass: high-spatial resolution exposure to source-resolved atmospheric particle number and chemical mixing state," *Environmental Health Perspectives*, Jan 2020.

AA Presto, Q Ye, HZ Li, **ES Robinson**, P Gu, RC Sullivan, JS Apte, AL Robinson, NM Donahue, "Exposure Beyond Mass: High-spatial Resolution Exposure to Source-resolved Atmospheric Particle Number and Chemical Mixing State," *Environmental Epidemiology*, Nov 2019.

V Duflot, P Tuet, O Flores, A Colomb, L Deguillaume, M Vaitillngom, A Perring, A Huffman, MT Hernandez, K Sellegri, **ES Robinson**, DJ O'Connor, OM Gomez, F Burnet, T Bourrianne, D Strasberg, M Rocco, AK Bertram, P Chazette, J Totems, J Fournel, P Stamenoff, JM Metzter, M Chabasset, C Rousseau, E Bourrianne, M Sancelme, AM Delort, RE Wegener, C Chou, P Elizondo, "Preliminary results from the FARCE 2015 campaign: multidisciplinary study of the forest–gas–aerosol–cloud system on the tropical island of La Réunion," *Atmospheric Chemistry and Physics*, Aug 2019.

ES Robinson, RU Shah, K Messier, P Gu, HZ Li, JS Apte, AL Robinson, and AA Presto, "Land-use regression modeling of source-specific fine particulate components in an urban environment," *Environmental Science & Technology*, Jul 2019.

HZ Li, P Gu, Q Ye, N Zimmerman, **ES Robinson**, R Subramanian, JS Apte, AL Robinson, and AA Presto, "Spatially dense air pollutant sampling: Implications of spatial variability on the representativeness of stationary air pollutant monitors," *Atmospheric Environment: X*, Apr 2019.

AT Ahern, **ES Robinson**, DS Tkacik, R Saleh, LE Hatch, KC Barsanti, CE Stockwell, RJ Yokelson, AA Presto, AL Robinson, RC Sullivan, NM Donahue, "Production of secondary organic aerosol during aging of biomass-burning smoke from fresh fuels and its relationship to VOC precursors," *Journal of Geophysical Research: Atmospheres*, Mar 2019.

RU Shah, **ES Robinson**, P Gu, AL Robinson, JS Apte, and AA Presto, "High-spatial-resolution mapping and source apportionment of aerosol composition in Oakland, California, using mobile aerosol mass spectrometry," *Atmospheric Chemistry and Physics*, Nov 2018.

P Gu, HZ Li, Q Ye, **ES Robinson**, JS Apte, AL Robinson, and AA Presto, "Intra-city variability of PM exposure is driven by carbonaceous sources and correlated with land use variables," *Environmental Science & Technology*, Sep 2018.

ES Robinson, P Gu, Q Ye, HZ Li, RU Shah, JS Apte, AL Robinson , and AA Presto, "Restaurant Impacts on Outdoor Air Quality: Elevated Organic Aerosol Mass from Restaurant Cooking with Neighborhood-Scale Plume Extents," *Environmental Science & Technology*, Aug 2018.

PK Saha, **ES Robinson**, RU Shah, N Zimmerman, JS Apte, AL Robinson, AA Presto, "Reduced Ultrafine Particle Concentration in Urban Air: Changes in Nucleation and Anthropogenic Emissions," *Environmental Science & Technology*, May 2018.

Q Ye, P Gu, HZ Li, **ES Robinson**, E Lipsky, C Kaltsonoudis, AKY Lee, JS Apte, AL Robinson, RC Sullivan, AA Presto, NM Donahue, "Spatial Variability of Sources and Mixing State of Atmospheric Particles in a Metropolitan Area," *Environmental Science & Technology*, May 2018.

A Sinha, R Saleh, **ES Robinson**, AT Ahern, DS Tkacik, AA Presto, RC Sullivan, AL Robinson, NM Donahue, "Mass accommodation coefficients of fresh and aged biomass-burning emissions," *Aerosol Science and Technology*, Mar 2018.

Q Ye, MA Upshur **ES Robinson**, F Geiger, RC Sullivan, R Thomson, NM Donahue, "Following particle-particle mixing in atmospheric secondary organic aerosols by using isotopically labeled terpenes," *Chem*, Feb 2018.

N Zimmerman, AA Presto, SPN Kumar, J Gu, A Hauriliuk, **ES Robinson**, AL Robinson, R Subramanian, "A machine learning calibration model using random forests to improve sensor performance for lower-cost air quality monitoring," *Atmospheric Measurement Techniques*, Jan 2018.

ES Robinson, RS Gao, JP Schwarz, DW Fahey, AE Perring, "Fluorescence calibration method for single-particle aerosol fluorescence instruments," *Atmospheric Measurement Techniques*, May 2017.

DS Tkacik, **ES Robinson**, AT Ahern, R Saleh, C Stockwell, P Veres, IJ Simpson, S Meinardi, DR Blake, RJ Yokelson, AA Presto, RC Sullivan, NM Donahue, AL Robinson, "A dual-chamber method for quantifying the effects of atmospheric perturbations on secondary organic aerosol formation from biomass burning emissions," *Journal of Geophysical Research: Atmospheres*, Mar 2017.

ES Robinson, TB Onasch, D Worsnop, NM Donahue, "Collection efficiency of α-pinene secondary organic aerosol particles explored via light-scattering single-particle aerosol mass spectrometry," *Atmospheric Measurement Techniques*, Mar 2017.

R Saleh, **ES Robinson**, AT Ahern, NM Donahue, "Evaporation rate of particles in the vaporizer of the Aerodyne aerosol mass spectrometer," *Aerosol Science & Technology*, Dec 2016.

Q Ye, **ES Robinson**, X Ding, P Ye, RC Sullivan, NM Donahue, "Mixing of secondary organic aerosols versus relative humidity," *Proceedings of the National Academy of Sciences*, Nov 2016.

ES Robinson, NM Donahue, AT Ahern, Q Ye, E Lipsky, "Single-particle measurements of phase partitioning between primary and secondary organic aerosols" *Faraday Discussions*, Jan 2016.

P Ye, X Ding, J Hakala, V Hofbauer, **ES Robinson**, NM Donahue, "Vapor wall loss of semi-volatile organic compounds in a Teflon chamber" *Aerosol Science and Technology*, Jul 2016.

P Ye, X Ding, Q Ye **ES Robinson**, NM Donahue, "Uptake of semivolatile secondary organic aerosol formed from α-pinene into nonvolatile polyethylene glycol probe particles," *Journal of Physical Chemistry A*, Dec 2015.

ES Robinson, R Saleh, NM Donahue, "Probing the evaporation dynamics of mixed SOA/squalane particles using size-resolved composition and single-particle measurements" *Environmental Science & Technology*, Jul 2015.

P Ye, X Ding, Q Ye **ES Robinson**, NM Donahue, "Uptake of semivolatile secondary organic aerosol formed from α-pinene into nonvolatile polyethylene glycol probe particles," *Journal of Physical Chemistry A*, Dec 2015.

M Riva, **ES Robinson**, E Perraudin, NM Donahue, E Villenave, "Photochemical aging of secondary organic aerosols generated from the photooxidation of polycyclic aromatic hydrocarbons in the gas-phase" *Environmental Science & Technology*, Apr 2015.

R Saleh, **ES Robinson**, DS Tkacik, AT Ahern, S Liu, AC Aiken, RC Sullivan, AA Presto, MK Dubey, RJ Yokelson, NM Donahue, AL Robinson, "Brownness of organics in aerosols from biomass burning linked to their black carbon content" *Nature Geoscience*, Aug 2014.

ES Robinson, R Saleh, NM Donahue, "Organic aerosol mixing observed by single-particle mass spectrometry" *The Journal of Physical Chemistry A*, Nov 2013.

R Saleh, CJ Hennigan, GR McMeeking, WK Chuang, **ES Robinson**, H Coe, NM Donahue, AL Robinson, "Absorptivity of brown carbon in fresh and photo-chemically aged biomass-burning emissions" *Atmospheric Chemistry and Physics*, Aug 2013.

AWARDS & SCHOLARSHIPS

- Mass Media Fellow, American Association for the Advancement of Science — 2013
  Selected as one of 15 science communication fellows.
  Worked at NPR-affiliate station in Colorado as a science reporter.
- Udall Scholar, Morris K. Udall Foundation — 2008
  Prestigious national scholarship for undergraduates having demonstrated commitment to a career path related to the environment.

TEACHING EXPERIENCE

- Environmental Engineering Laboratory (JHU EN.570.304) 2022
  Guest Lecturer for the ”Air Lab” module of the course.
  Designed and led a hands-on air quality project that included field measurements, geospatial data analysis.
- Advanced Reaction Kinetics (CMU 06-702) 2011
  Teaching Assistant for graduate course for M.S. and Ph.D. students.
  One guest lecture; held multiple weekly office hours for one-on-one QA; graded homeworks and exams.
- Unit Operations Laboratory (CMU 06-423) 2009, 2010
  Teaching Assistant for two semesters for upper-level undergraduate students.
  Worked as a “Project Leader” for multiple teams of students designing and carrying out experiments; mentored students; graded assignments.

PROFESSIONAL REFERENCES

- Professor **Neil M. Donahue** nmd@cmu.edu – +1 (412) 268-4415
  Relationship: Graduate Advisor
  Affiliations: Carnegie Mellon University, Depts. of Chemistry, Chemical Engineering, and Engineering & Public Policy. Director, Steinbrenner Institute for Environmental Education and Research. Member, Center for Atmospheric Particle Studies
- Associate Professor **Peter F. DeCarlo** pdecarl1@jhu.edu – +1 (443) 927-3374
  Relationship: Current Supervisor
  Affiliations: Johns Hopkins University, Dept. of Environmental Health & Engineering
- Professor **Allen L. Robinson** alr@andrew.cmu.edu – +250 (791) 569 253
  Relationship: Postdoc Supervisor, Member of Thesis Committee
  Affiliations: Carnegie Mellon University, Dept. of Mechanical Engineering. Director, CMU Africa. Director, Center for Air, Climate, and Energy Solutions (CACES). Associate Dean for International Programs in Africa, College of Engineering. Member, Center for Atmospheric Particle Studies.
- Professor **William (Bill) Simpson** wrsimpson@alaska.edu – +1 (907) 474-7185
  Relationship: Current collaborator
  Affiliations: University of Alaska Fairbanks, Dept. of Chemistry & Biochemistry, Geophysical Institute.