Emily Barnes Franklin, PhD

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EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY Berkeley, CA
Ph.D., Civil and Environmental Engineering August 2022
Anthropogenic Influences on Coastal and Tropical Biogenic Aerosols: Advancing Data-Science-Driven Chemical Analysis for Climate and Public Health
Dissertation Committee Chair: Allen Goldstein

UNIVERSITY OF CALIFORNIA, BERKELEY Berkeley, CA
Master of Science, Environmental Engineering May 2018

YALE UNIVERSITY New Haven, CT
Bachelor of Science, Environmental Engineering May 2017
Magma Cum Laude, Distinction in Major

RESEARCH EXPERIENCE

REACTIVE GASES RESEARCH SCIENTIST 2023 - present
Commonwealth Scientific and Industrial Research Organization (CSIRO) Aspendale, VIC (Australia)

- Conducted long-term measurements of reactive gases at Kenaook Cape Grim
- Investigated perturbations to chemistry of the remote southern ocean atmosphere through marine voyage field campaigns
- Skills: Mass Spectrometry, Gas Chromatography, Sampler Construction and Experimental Design, Machine Learning/Data Analytics, Programming and Software Development (R, Python, Igor Pro)

NSF-MPS ASCEND POSTDOCTORAL RESEARCH FELLOW 2022 - 2023
Colorado State University Fort Collins, CO

- Characterized contributions of volatile chemical products to urban aerosol pollution as a member of the AEROMMA/FROG-NY field campaign research team
- Developed machine learning-based cheminformatics tools for characterizing complex organic mixtures

NSF GRADUATE RESEARCH FELLOW, GOLDSTEIN RESEARCH GROUP 2018 - 2022
University of California, Berkeley Berkeley, CA

- Characterized significance and mechanics of anthropogenic influence on marine organic emissions, including novel speciated characterization of organic content of coastal sea spray aerosol and identification of hazardous pollutants in sea spray aerosol and marine VOC's
- Identified seasonality and significance of urban pollution and anthropogenic biomass burning in altering characteristics and elevating quantities of biogenic organic aerosol in the Amazon basin
- Developed new machine-learning based model for quantifying and characterizing novel organic species using TD-GCxGC-EI-ToF-MS

UNDERGRADUATE STUDENT RESEARCHER, GENTNER RESEARCH GROUP

Yale University New Haven, CT August 2014 – December 2014; December 2016-May 2017

- Investigated BVOC oxidation pathways, analyzing field and chamber samples and highly time-resolved CIMS data to illustrate reaction pathways through molecular corridors
- Developed software tools to automate, merge, and streamline untargeted analysis of speciated chemical data from diverse suites of chemical instrumentation

AWARDS & FUNDING

- NSF-MPS-Ascend Postdoctoral Fellowship September 2022
- Soroptimist Founder Region Fellowship April 2021
- Center for Aerosol Impacts on Chemistry of the Environment October 2020
  Year 8 Funding Proposal Co-Author
- Center for Aerosol Impacts on Chemistry of the Environment May 2019
  Seed Grant Co-Author
- National Science Foundation Graduate Research Fellowship May 2018
- Civil and Environmental Engineering Department Fellowship August 2017-May 2018
- Phi Beta Cappa Academic Honor Society Elected May 2017
- Kiphuth Student-Athlete Achievement Award May 2017
  Highest GPA of any Female Student Athlete Earning Multiple Varsity Letters
- Ford Student-Athlete Community Outreach Award May 2017
- Tau Beta Pi Engineering Honor Society, Corresponding Secretary Elected September 2015

PUBLICATIONS

Journal Publications

- **Franklin, E.B.,** Rossell, R.K., Vermeuel, M.P., De Groodt, A., Rediger, K., Yee, L.D., Marcantonio, J., Maddaleno, T., Osburn, C., O'Brien, R.E., Commane, R., Mak, J.E., Goldstein, A.H., Millet, D.B., Farmer, D.K. "Emerging Drivers of North American Urban Aerosol Increase Global Change Vulnerability." *Science Advances* (In Review, 2024)
- Ofodile, J., Alves, M.R., Liang, Y., **Franklin, E.B.**, Lunderberg, D.M., Ivey, C.E., Singer, B.C., Nazaroff., W.W., Goldstein, A.H. "Characterizing PM2.5 emissions and Temporal Evolution of Organic Composition from Incense Burning in a California Residence." ***Env Science and Technology*** (2024)
- **Franklin, E.B.,** Yee, L., Wernis, R., Isaacman-VanWertz, G., Kreisberg, N., Weber, R., de Sá, S., Palm, B., Hu, W., Campuzano-Jost, P., Day, D. A., Manzi, A., Artaxo, P., De Souza, R. A. F., Jimenez, J., Alexander, L., Martin, S., Goldstein, A., "Chemical Signatures of Seasonally Unique Anthropogenic Influences on Organic Aerosol Composition in the Central Amazon" ***Env. Science and Technology*** (2023).
- **Franklin, E.B.,** Amiri, S., Crocker, D., Sauer, J., Mayer, K., Morris,C., Weber,R., Lee, C., Malfatti, F., Cappa, C., Bertram, T., Prather, K., Goldstein, A. "Anthropogenic and Biogenic Contributions to the Organic Composition of Coastal Submicron Sea Spray Aerosol." ***Env. Science and Technology*** (2022)
- **Franklin, E.B.,** Yee, L., Weber, R., Grigas, P., Goldstein, A.H. "Ch3MS-RF: A Random Forest Model for Chemical Characterization and Improved Quantification of Unidentified Atmospheric Organics Detected by Chromatography-Mass Spectrometry Techniques" ***Atmospheric Measurement Techniques*** (2022). https://doi.org/10.5194/amt-15-3779-2022

- Crocker, D., Kaluarachchi, C., Cao, R., Dinasquet, J., **Franklin**, **E.**; Morris, C., Nguyen, T., Torres, R., Martz, T., Malfatti, F., Goldstein, A., Tivanski, A., Prather, K., Thiemens, M. "Isotopic Insights into Organic Composition Differences between Supermicron and Submicron Sea Spray Aerosol." ***Env. Science and Technology*** (2022).
- Sauer, J.S., Mayer, K.J., Lee, C., Alves, M.R., Amiri, S., **Franklin, E.**, Crocker, D.R., Dinasquet, J., Kaluarachchi, C., Dang, D., Kilgour, D., Mitts, B.A., Morris, C.K., Moore, A.N., Tumminello, P.R., Walker, J.L., Goldstein, A.H., Grassian, V.H., Jaffe, J., Malfatti, F., Martz, T.R., Tivanski, A.V.,Cappa, C.D., Bertram, T.H., Prather, K.A. "The Sea Spray Chemistry and Particle Evolution Study (SeaSCAPE): Overview and Experimental Methods". ***Environmental Science: Processes and Impacts***, (2022). https://pubs.rsc.org/en/content/articlelanding/2022/em/d1em00260k
- Kilgour, D., Novak, G., Sauer, J., Moore, A., Dinasquet, J., Amiri, S., **Franklin, E.**, Mayer, K., Winter, M., Morris, C., Price, T., Malfatti, F., Crocker, D., Lee, C., Cappa, C., Goldstein, A., Prather, K., Bertram, T., "Marine gas-phase sulfur emissions during an induced phytoplankton bloom." ***Atmospheric Chemistry and Physics*** (2021). https://doi.org/10.5194/acp-22-1601-2022
- **Franklin, E.B**., Alves, M.R., Moore, A.N., Kilgour, D., Novak, G., Mayer, K., Sauer, J., Weber, R.J., Dang, D., Winter, M., Lee, C., Cappa, C.D., Bertram, T.H., Prather, K.A., Grassian, V., Goldstein, A.G. "Atmospheric Benzothiazoles in a Coastal Marine Environment." ***Env. Science and Technology***, (2021). https://pubs.acs.org/doi/10.1021/acs.est.1c04422
- Ditto, J.C**., Barnes, E.B.**, Khare, P. et al. "An omnipresent diversity and variability in the chemical composition of atmospheric functionalized organic aerosol." ***Nature Communications Chemistry***, (2018). https://doi.org/10.1038/s42004-018-0074-3

TEACHING EXPERIENCE

Classroom Teaching

University of California, Berkeley; Berkeley, CA

- *Air Pollution* • Graduate Student Instructor • Spring 2022

Mt. Tamalpais College (Prison University Project); San Quentin State Prison, San Quentin CA

- *Environmental Science* • Instructor and Course Designer • Fall 2021
  Developed and taught accredited environmental science seminar course to 10 students. Topics covered include air pollution, meteorology, climate change, environmental ethics, environmental justice, and energy. Responsibilities include syllabus development, assignment design, and assignment grading, along with designing and delivering lectures, assessments, and class learning activities.

Patten University at San Quentin (Prison University Project); San Quentin State Prison, San Quentin CA

- *Math 50 A* • Instructor • Summer 2018
  Taught college preparatory math course with 20 students in accredited curriculum enabling students to achieve an Associate's Degree while incarcerated at San Quentin State Prison. Collaborated with co-instructors in syllabus development, assignment design, and assignment grading. Designed and delivered lectures, tests, and in class learning activities. Awarded an average of 4.8/5 on anonymous end of semester teacher evaluations.
- *Elementary Algebra* • Teaching Assistant • Fall 2018
  Ran weekly discussion sessions and provided tutoring for students in Elementary Algebra course. Responsibilities included supporting students with learning differences, administering make-up tests, and coordinating student support with course instructors. Simultaneously provided unofficial tutoring support to students in the Environmental Science course.

Teaching Professional Development

- National Environmental Justice Education and Teaching Workshop • Stanford University • Remote • September 2021

- Graduate Student Instructor Fall Workshops on Teaching • UC Berkeley • Berkeley CA • Fall 2021

LEADERSHIP AND SERVICE

Mentorship and Community Service

- Thriving Earth Exchange Community Science Fellow (American Geophysical Union) March 2023-Present
- Mitigación de Aerosoles Para La Comunidad (La Clínica de la Raza, Oakland CA) December 2021
  Built and distributed low-cost air purifiers, developed Spanish language educational materials, and discussed aerosol mitigation for COVID-19 and smoke exposure reduction with patients in partnership with a food, toy, and book drive at La Clínica de la Raza, a clinic network dedicated to serving East Bay's low income and monolingual Spanish speaking communities.
- Aerosol Education and Mitigation for Students (Longfellow Middle School, Berkeley CA) Sept 2021
  Designed, funded (through Soroptimist Fellowship) and lead a public health and educational campaign based out of Longfellow Middle School focused on aerosol education, reducing students' exposure to wildfire smoke during the California fire season, and educating the local community about low-cost options for improving indoor air quality during smoke events. All ~130 6th grade students from a primarily low-income middle school in Berkeley were provided with simple air purifiers, introduced to the basics of aerosol science through an in-class interactive lesson, and provided with English and Spanish-language pamphlets outlining simple strategies for indoor aerosol reduction.
- Científico Latino Mentor (Remote) August 2020 – Present
  Mentored women from underrepresented backgrounds in STEM through graduate school applications and PhD fellowship applications.
- Be A Scientist Mentor (Longfellow Middle School, Berkeley CA) January 2020 – Jan 2022
  Mentored teams of 7th grade girls from underrepresented backgrounds in STEM through science fair-style research projects of their own choice and invention.

Institutional Service

- Diversity, Inclusion, and Belonging committee at CSIRO Environment, Inclusion and Belonging in Field Research Working Group Chair June 2024-Present
- Session Chair, Health Related Aerosols (Am. Association of Aerosol Research, Raleigh NC) Oct 2022
- Harassment Prevention Trainer (Building a Better Fieldwork Future, Santa Cruz CA) Oct 2021-2023
  Certified facilitator delivering workshops offering a suite of evidence-based tools for field researchers, instructors, and students to prevent, intervene in, and respond to sexual harassment and assault in research settings. Currently serving on the working group to develop racially motivated harassment prevention training materials.
- Peer Reviewer (GRL • STOTEN • Chemosphere • ES&T • ESPI) Dec 2020-present
- Climate Equity & Environmental Justice Faculty Search (UC Berkeley, Berkeley CA) Oct – Dec 2020
  Search Committee Full Voting Member, Student Sub-Committee Co-Chair
- Berkeley Atmospheric Science Center Seminar Series- Speaker Selection Committee Organizer (UC Berkeley, Berkeley CA) Oct 2020
  Organized graduate student committee tasked with selecting 10 speakers for a semester long seminar series. Led effort to solicit a second round of speaker nominations based on lack of gender and racial diversity among initial nominee list.

PRESENTATIONS

Invited Talks

- "Drivers of Aerosol Pollution in the Modern Megacity: Emerging Vulnerabilities in a Changing Climate" **EMILY FRANKLIN** (Seinfeld Symposium, California Institute of Technology, September 2024)
- "Harnessing Data Science for Improved Chemical Characterization of the Atmosphere," **EMILY FRANKLIN;** (Women in Data Science, Berkeley CA, March 2023)
- "Dynamics of Anthropogenic Influence on Aerosol Formation and Composition from Remote to Urban Environments: Advancing Data Science-Driven Chemical Analysis for Climate and Public Health" **EMILY FRANKLIN** (CU Boulder Environmental Engineering Seminar Series, Virtual, February 2023).

Oral Presentations

- "Biologically Mediated Aerosol Precursor Emissions and Secondary Aerosol Formation along the Antarctic Ice Edge," **EMILY FRANKLIN,** Caleb Mynard, Joel Alroe, Marc Mallet, Ruhi Humphries, Robert Strzepek, Erin Dunne (American Association of Aerosol Research, Albuquerque NM, October 2024)
- "Temperature and Age-Dependent Secondary Aerosol Precursor Emissions from Building Materials and Consumer Products and their Dynamics in Urban Aerosol" **EMILY FRANKLIN**, Rose K Rossell, Cameron Osburn, Alyssa Belanger, Lydia Tonnesen, Katelyn Rediger, Adam De Groodt, Michael Vermeuel, Trey Maddaleno, Dylan Millet, Allen Goldstein, Delphine K Farmer (American Association of Aerosol Research, Albuquerque NM, October 2024)
- "Non-Traditional Anthropogenic Contributions to Particulate Pollution in the Modern Megacity" **EMILY FRANKLIN**, Rose Rossell, Katelyn Rediger, Michael Vermeuel, Trey Maddaleno, Lindsay Yee, Cameron Osburn, Rachel O'Brien, Adam De Groodt, Allen Goldstein, Dylan Millet, Delphine Farmer (American Geophysical Union, San Francisco CA, December 2023)
- "Challenges and Opportunities in Advancing Speciated Characterization of Atmospheric Organics," **EMILY FRANKLIN**, Lindsay Yee, Allen Goldstein, Delphine Farmer (NOAA Global Monitoring Annual Conference, Boulder CO, May 2023)
- "Knowledge, Chemical Diversity, and Chemical Property Differences Between Source Groups Bias Speciated Analyses of Aerosol-Phase Biogenic Hydrocarbons" **EMILY FRANKLIN**, Lindsay Yee, Rebecca Wernis, Gabriel Isaacman-VanWertz, Nathan Kreisberg, Robert Weber, Suzane de Sá, Brett B. Palm, Weiwei Hu, Pedro Campuzano-Jost, Douglas A. Day, Antonio Manzi, Paulo Artaxo, Rodrigo A. F. De Souza, Jose L. Jimenez, Scot Martin, Allen Goldstein (**Gordon Conference on Biogenic Hydrocarbons,** June 2022).
- "Atmospheric Benzothiazoles in a Coastal Marine Environment: Implications for Sea Spray Aerosol Selective Organic Enrichment and Secondary Marine Aerosol Chemistry" **EMILY FRANKLIN,** Michael Alves, Delaney Kilgour, Alexia Moore, Gordon Novak, Kathryn Mayer, Jon Sauer, Duyen Dang, Chris Lee, Chris Cappa, Tim Bertram, Vicki H. Grassian, Kim Prather, Allen Goldstein (**American Geophysical Union,** December 2021)
- "Chemical Signatures of Fire and Urban Influenced Secondary Aerosol Formation in the Central Amazon," **EMILY FRANKLIN,** Lindsay Yee, Rebecca Wernis, Gabriel Isaacman-VanWertz, Nathan Kreisberg, Robert Weber, Suzane de Sá, Brett Palm, Weiwei Hu, Pedro Campuzano-Jost, Douglas A. Day, Antonio Manzi, Paulo Artaxo, Rodrigo A. F. De Souza, Jose Jimenez, Lizabeth Alexander, Scot Martin, Allen Goldstein; (**American Association of Aerosol Research**, October 2021)

- "Biological and Anthropogenic Influences on the Organic Composition of Coastal Sea Spray Aerosol." **EMILY BARNES**, Michael Alves, Liora Mael, Daniel Crocker, Kathryn Mayer, Jon Sauer, Robin Weber, Kim Prather, Vicki Grassian, Allen Goldstein; (**American Geophysical Union**, December 2020)

Posters

- "Characterizing Contributions of Volatile Chemical Products to Aerosol Chemistry and Composition in the Modern Megacity" **EMILY FRANKLIN,** Delphine Farmer; (ASCEND Postdoctoral Fellowship Conference, February 2023)
- "Machine Learning-Enhanced Chemical Characterization of Organic Emissions from the Coastal Ocean," **EMILY FRANKLIN,** Sarah Amiri, Daniel Crocker, Kathryn Mayer, Jonathan Sauer, Robert Weber, Christopher Lee, Francesca Malfatti, Christopher D. Cappa, Timothy H. Bertram, Kimberly A. Prather, Allen H. Goldstein; (**American Association of Aerosol Research,** October 2023)
- "Characterization and Quantification of Novel Ambient Organic Aerosol Compounds using Machine Learning and the UCB-GLOBES Mass Spectral Database" **EMILY FRANKLIN,** Lindsay Yee, Robert Weber, Paul Grigas, Allen Goldstein; (**American Association of Aerosol Research**, October 2021)
- "Chemical Signatures of Fire and Urban Influenced Secondary Aerosol Formation in the Central Amazon." **EMILY BARNES**, Lindsay Yee, Rebecca Wernis, Gabriel Isaacman-VanWertz, Nathan Kreisberg, Robert Weber, Suzane de Sá, Brett Palm, Weiwei Hu, Pedro Campuzano-Jost, Douglas A. Day, Antonio Manzi, Paulo Artaxo, Rodrigo A. F. De Souza, Jose Jimenez, Lizabeth Alexander, Scot Martin, Allen Goldstein; (**ARM/ASR Joint User Facility and Principal Investigators Meeting**, June 2021)
- "Anthropogenic Influences on Amazonian Organic Aerosol: A Molecular-Level Analysis." **EMILY BARNES**, Lindsay Yee, Gabriel Isaacman-VanWertz, Rebecca Wernis, Nathan Kreisberg, Robert Weber, Scot T. Martin, Brett Palm, Weiwei Hu, Pedro Campuzano-Jost, Douglas Day, Jose-Luis Jimenez, Paulo Artaxo, Allen Goldstein; (**American Association of Aerosol Research**, October 2020)
- "Algae to Aerosol: Speciated and Quantified Secondary Marine Aerosol Precursors." **EMILY BARNES**, Mike Alves, Kathryn Mayer, Robin Weber, Vicki Grassian, Kim Prather, Allen Goldstein. (Berkeley Atmospheric Science Center Symposium, February 2020)
- "Speciated Secondary Marine Aerosol Precursors" **EMILY BARNES**, Michael Alves, Delaney Kilgour, Robert Weber, Tim Bertram, Vicki Grassian, Allen Goldstein. (Center for Aerosol Impacts on Chemistry of the Environment Annual Meeting, November 2019)

PROFESSIONAL EXPERIENCE

FIELD RESEARCH AND COMMUNICATIONS INTERN August 2016 – September 2016

Colorado Fourteeners Initiative Golden, CO

- Developed software and modeling tools to track and predict trail use across Colorado's popular 14'ers trail system. Findings support applications for maintenance funds from local governments, prioritization of trail maintenance efforts, and are made publicly available
- Established and maintained high altitude trail infrared counter research stations in support of trail use research project
- Analyzed data and published a report estimating 2015 trail use for Sustainable Trails Program

WATER ENGINEERING INTERN August 2015 – September 2015

Wright Water Engineers Denver, CO

- Reviewed and synthesized scientific literature, licensing documentation, and BMP reports to inform and support expert witness testimonials given by senior company representatives

EXTRACURRICULAR

- Division I Varsity Cross Country and Track (Yale University) August 2013 – May 2017

REFERENCES

Allen Goldstein, Professor of Civil and Environmental Engineering
University of California, Berkeley
ahg@berkeley.edu

Delphine Farmer, Professor of Chemistry
Colorado State University
delphine.farmer@colostate.edu

Cesunica Ivey, Assistant Professor of Civil and Environmental Engineering
University of California, Berkeley
iveyc@berkeley.edu

Thomas Kirchstetter, Scientific Division Director, Energy Analysis and Environmental Impacts Division
Lawrence Berkeley National Laboratory
twkirchstetter@lbl.gov