Jia Jiang

Postdoctoral Associate

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Department of Civil and Environmental Engineering
Massachusetts Institute of Technology
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EDUCATION

University of California, Riverside

Ph.D. in Chemical and Environmental Engineering — Sep 2016 -Dec 2021

- Thesis: *Development of Chemical Mechanisms for Predictions of Ozone and Secondary Organic Aerosol Formation from Biomass Burning-Derived Precursors* (Advisor: Kelley Barsanti)

Zhejiang University

M.E. in Geological Engineering — Sep 2011 - Jun 2014

B.S. in Atmospheric Science — Sep 2007 - Jun 2011

SKILLS

Atmospheric Modeling: WRF, AERMOD, UCD/CIT, F0AM

Chemical Mechanism Development: SAPRC, MechGen, CMAQ

Programming & Data Tools: Fortran, Python, MATLAB, SQLite, Linux, Git, ArcGIS, BenMap

Focus Areas: Ozone, PM, Air Toxics, Wildfire Emissions, Exposure Assessment, Public Health, Environmental Justice

Language: English, Chinese/Mandarin

EXPERIENCE

Postdoctoral Associate — Feb 2024 - Present

Massachusetts Institute of Technology | Department of Civil and Environmental Engineering

Project (EPA-funded): Leveraging Organic Oxidation Experiments for Atmospheric Mechanism Development

- Evaluated monoterpene oxidation chemistry in CRACMM, emphasizing the critical role of PANs.
- Developed a chemical speciation algorithm to convert high-resolution lab data into model-ready formats.
- Built a relational database and automated ETL pipeline linking lab data with chemical models.
- Created an open-source Python/SQLite toolkit to support chemical mechanism development.

Postdoctoral Associate — Jan 2022 - Dec 2023

University of California, Davis | Department of Civil and Environmental Engineering

Project 1 (USDA-funded): Assessment of Wildfire Smoke Exposure Risks to Grapes in Vineyards

- Developed a wildfire speciation profile expanding CARB's wood combustion inventory from 14 to 72 reactive organic gas species, improving air toxics and health risk modeling resolution.
- Applied data fusion techniques combining EPA monitoring stations, PurpleAir sensors, in-situ meteorological observations, and satellite aerosol optical depth (AOD) data using a random forest approach. Reduced model bias and improved forecast accuracy for wildfire smoke exposure and key pollutants.

Project 2 (CARB-funded): Long-Term Environmental Impacts Under the Manure Management Program

- Led source-oriented simulations of PM and ozone exposure from animal agriculture emissions under future energy and greenhouse gas (GHG) scenarios.
- Calculated health co-benefits and environmental justice (EJ) metrics from GHG mitigation strategies in support of environmental justice goals under CEQA.

Graduate Student Researcher Sep 2016 - Dec 2021

University of California, Riverside | Department of Chemical and Environmental Engineering

Project 1 (EPA-funded): Developing Chemical Mechanisms of Emerging Sources for Community Air Quality Predictions

- Built detailed oxidation mechanisms for wildfire-relevant VOCs (furans, phenols and monoterpenes) using the SAPRC mechanism generator (MechGen), and implemented them into air quality models to improve simulation accuracy.

Project 2 (NSF-funded): Mechanistic Studies of Secondary Organic Aerosol Production from Wildfire Precursors

- Applied advanced computational modeling techniques to investigate the reaction kinetics and mechanistic pathways of peroxyl radicals, a key intermediate in the formation of SOA.

Volunteer Researcher Oct 2015 - May 2016

University of California, Irvine | Donald Bren School of Information and Computer Sciences

Project: Assessed Urban Water Infrastructure Risk

- Collaborated with GIS and computer science teams to develop a risk assessment framework for water system vulnerability by analyzing pipe failure data in relation to extreme weather patterns.

Meteorologist Jul 2014 - Aug 2015

Taizhou Meteorological Bureau

- Delivered short- and long-term county-level weather forecasts, combining surface observations with radar, satellite imagery, and model guidance.
- Communicated real-time warnings and briefings to local media and emergency response teams during typhoons and weather events, helping the public prepare and respond.

Graduate Student Researcher Sep 2011 - Jun 2014

Zhejiang University | School of Earth Science

Project 1: Genesis Study of Tropical Cyclones over the Pacific Ocean

- Classified Pacific tropical cyclones based on formation patterns using large-scale circulation and gridded datasets.
- Leveraged gridded meteorological datasets and satellite products to trace the evolution of initial disturbances into tropical cyclones

Project 2: Orographic Effects for Mesoscale Weather Systems

- Used WRF, satellite, and in situ data to study terrain impacts on mesoscale precipitation and wind systems.
- Applied data assimilation techniques to enhance model inputs and produce more accurate

LEADERSHIP & SERVICE

Student Mentor 2021 - Present

- Mentor graduate students in atmospheric modeling, chemical mechanisms, and research development.

Peer Reviewer 2021 - Present

- Review manuscripts for leading journals (e.g. Atmospheric Chemistry and Physics).

Teaching Assistant 2011 - 2012 & 2017 - 2019

- Led discussion sections and provided MATLAB support for the course “Engineering Modeling and Analysis”, and graded assignments and exams (~100 students).
- Delivered lectures twice a week and hands-on WRF model labs for the course “Numerical Weather Forecast” (~20 students).

AWARDS & HONORS

Esther F. Hays Graduate Fellowship, Center for Environmental Research and Technology, UC Riverside 2020

Dean’s Distinguished Fellowship Award, Chemical and Environmental Engineering, UC Riverside 2016

Outstanding Student Award, National Weather Forecaster Professional Training Program 2014

Scholarship for Excellence in Special Major, School of Earth Science, Zhejiang University 2010

National Talent Cultivation Scholarship, Department of Chemistry, Zhejiang University 2009

PUBLICATIONS

Jiang, J., Franco L., Helstrom E., Pye H., Skipper T.N., Schwantes R., Kroll J., 2025. Framework of Chemical Assessment for Mechanism Evaluation and Optimization (CAMEO): in preparation.

Jiang, J., Shahid S.B., Zhang Y. Y., Cocker III, D.R. and Barsanti, K.C., 2025. Evaluation of A New Gas-Phase Mechanism of Phenolic Compounds under Atmospheric Relevant Conditions: (in preparation)

Carter, W.P., **Jiang, J.**, Wang, Z. and Barsanti, K.C., 2025. The SAPRC Atmospheric Chemical Mechanism Generation System (MechGen). *Geoscientific Model Development*: under review.

Carter, W.P., **Jiang, J.**, Orlando, J.J. and Barsanti, K.C., 2025. Derivation of Atmospheric Reaction Mechanisms for Volatile Organic Compounds by the SAPRC Mechanism Generation System (MechGen). *Atmospheric Chemistry and Physics*: doi.org/10.5194/acp-25-199-2025.

Jiang, J., Li, Y., and Kleeman, M.: Air Quality and Public Health Effects of Dairy Digesters in California, *Atmos. Environ*. 2024: doi.org/10.1016/j.atmosenv.2024.120588.

Li, Q., **Jiang, J.**(co-first), Afreh, I.K., Barsanti, K.C. and Cocker III, D.R., 2022. Secondary Organic Aerosol Formation from Camphene Oxidation: Measurements and Modeling. *Atmospheric Chemistry and Physics*: doi.org/10.5194/acp-22-3131-2022.

Meehan-Atrash, J., Luo, W., McWhirter, K.J., Dennis, D.G., Sarlah, D., Jensen, R.P., Afreh, I., **Jiang, J.**, Barsanti, K.C., Ortiz, A. and Strongin, R.M., 2021. The influence of terpenes on the release of volatile organic compounds and active ingredients to cannabis vaping aerosols. RSC advances: doi.org/10.1039/D1RA00934F.

Jiang, J., Carter, W.P., Cocker III, D.R. and Barsanti, K.C., 2020. Development and Evaluation of a Detailed Mechanism for Gas-Phase Atmospheric Reactions of Furans. *ACS Earth and Space Chemistry*: doi.org/10.1021/acsearthspacechem.0c00058.

Wei, G.F., Zhu, P.J., **Jiang, J.**, and Liu, H.J., 2017, Analysis of Structure Evolution and Environmental Conditions of Tropical Cyclones Over the Western North Pacific During Extratropical Transition., *Journal of Tropical Meteorology*.: doi.org/10.16555/j.1006-8775.2017.01.002.

Jiang, J., Zhu, P.J., and Jiang, J., 2016. The Formation and Structure Evolution of Initial Disturbance of Typhoon Fung-Wong, *Journal of Tropical Meteorology*.: doi.org/10.16555/j.1006-8775.2016.01.001.

SELECTED PRESENTATIONS

Jiang, J., et al., Dec 2024, A Systematic Comparison Between Laboratory Measurements and Mechanistic Modeling of VOC Oxidation Reactions, *American Geophysical Union (AGU) 2024 Annual Meeting.*

Jiang, J., et al., Dec 2024, A Framework for Integrating Laboratory Data into Chemical Mechanism Development, *Atmospheric Chemical Mechanisms Conference 2024.*

Jiang, J., et al., Oct 2024, Modeling SOA Formation from Phenols Using an Updated Gas-Phase Mechanism and Revised SOA Parameters, *American Association for Aerosol Research (AAAR) 42nd Annual Conference.*

Jiang, J., et al., Oct 2024, A Systematic Comparison Between Laboratory Chamber Measurements and Mechanistic Predictions of Complex Oxidation Reactions, *American Association for Aerosol Research (AAAR) 42nd Annual Conference.*

Jiang, J., et al., Dec 2023, Long-Term Air Quality and Health Effects of Dairy Digesters in the Future Northern California, *International Aerosol Modeling Algorithms Conference 2023.*