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Princeton University

PROFESSIONAL EXPERIENCE

- **CIMES Postdoc Fellow, NOAA GFDL/Princeton University** — Princeton, NJ, USA
  Host: Paul Ginoux — 09/2023 - Present
  Research: Bridging scales in aerosol microphysics: from fundamental understanding to aerosol representation in atmospheric climate models
- **Visiting Scholar in Atmospheric Sciences, Texas A&M University** — College Station, TX, USA
  Host: Yue Zhang — 08/2023
  Research: Aerosol phase states on ice nucleation: measurements, modeling, and impacts

EDUCATION

- **Ph.D. in Civil and Environmental Engineering, Princeton University** — Princeton, NJ, USA
  Advisor: Ian C. Bourg — 08/2018 – 06/2023
  Thesis: Water, salt, organics, and minerals: improved understanding of aerosol microphysics from a nanoscale basis
- **B.S. in Energy and Resources Engineering and Economics, Peking University** — Beijing, China
  Research Advisor: Dongxiao Zhang — 09/2014 – 07/2018
  Thesis: Measurement and evaluation of CO_2 storage capacity in porous media

SELECTED HONORS & AWARDS

- **C. Ellen Gonter Environmental Chemistry Award**, American Chemical Society — 2023
  Highest award for graduate research in environmental chemistry.
- **Civil and Environmental Engineering Departmental Travel Award**, Princeton University — 2022
- **School of Engineering and Applied Science Travel Award**, Princeton University — 2022
- **Walbridge Fund Graduate Award for Environmental Research**, Princeton University — 2021
- **Merit Student** (Awarded 4 times), Peking University — 2014 – 2018
- **Cyrus Tang Scholarship** (Awarded 4 times), Cyrus Tang Foundation — 2014 – 2018
- **National Encouragement Scholarship** (Awarded 4 times), Chinese Ministry of Education — 2014 – 2018
- **National Scholarship**, Chinese Ministry of Education — 2017
- **Meritorious Winner**, International Mathematical Contest in Modeling — 2016
- **2nd Prize in National College Students Physics Competition**, Chinese Physical Society — 2015

FUNDING/PROPOSAL EXPERIENCE

- Earth's Radiation Budget Program, National Oceanic and Atmospheric Administration, *"Integrating Observations and Modeling in Support of Process Understanding Relevant to Solar Radiation Modification Research"*, 2025-2028, Li as **co-I**.
- Cooperative Institute for Modeling the Earth System, Princeton University/Geophysical Fluid Dynamics Laboratory, "*Nanoscale insights in global atmospheric models: enhancing aerosol representation with a new microphysics model",* 2023-2025; $136,900 awarded to Li (**PI**).

- Walbridge Fund, High Meadows Environmental Institute, Princeton University, *"Wettability of black carbon and its impact on radiative forcing: a comparative molecular dynamics (MD) simulation and experimental study"* 2021; $2500 awarded to Li (**PI**).

PROFESSIONAL SERVICES

- **Peer Reviewer.** Journal of the American Chemical Society, ACS Earth and Space Chemistry, ACS Omega
- **Conference Session Leading Chair**. American Geophysical Union (AGU) 2024 Fall Meeting 2024
  A119: Recent advances in aerosol representation and its impacts on climate, air quality and health
- **Colloquium Organizer**. High Meadows Environmental Institute, Princeton University 2021– 2022
  Colloquium for Graduate Certificate in Environmental Studies
- **Seminar Organizer**. Civil and Environmental Engineering, Princeton University 2021– 2022
  Environmental Engineering and Water Resources (EEWR) Brown Bag Seminar
- **Conference Session Co-chair.** American Geophysical Union (AGU) 2021 Fall Meeting 2021
  A35N: Molecular-scale characterization of atmospheric aerosol using simulations and experiments
- **Undergrad Research Mentor.** High Meadow Environmental Institute, Princeton University 2021
  Trained 3 undergraduate students in molecular dynamics simulation and data analysis.

PUBLICATIONS

1. **Xiaohan Li**, Wolf Martin, Xiaoli Shen, Isabelle Steinke, Zhenli Lai, Sining Niu, Manish Shrivastava, Swarup China, Zhenfa Zhang, Avram Gold, Jason D. Surrat, Ian C. Bourg, Daniel J. Cziczo, Susannah Burrows, Yue Zhang. Quantifying and modeling the impact of phase state on the ice nucleation abilities of a key component from isoprene-epoxydiols-derived secondary organic aerosols (IEPOX-SOA). *Environmental Science & Technology*, in review (revision submitted). (2024).
2. **Xiaohan Li**, Ian C. Bourg. Hygroscopic growth of adsorbed water films on smectite clay particles. *Environmental Science & Technology*, 58, 2, 1109–1118. (2024).
3. **Xiaohan Li**. Water, salt, organics, and minerals: improved understanding of aerosol microphysics from a nanoscale basis. *Princeton University*. (2023)
4. **Xiaohan Li**, Ian C. Bourg. Phase State, surface tension, water activity, and accommodation coefficient of water–organic clusters near the critical size for atmospheric new particle formation. *Environmental Science & Technology*, 57, 13092-13103. (2023).
5. **Xiaohan Li**, Ian C. Bourg. Microphysics of liquid water in sub-10 nm ultrafine aerosol particles. *Atmospheric Chemistry and Physics*, 23, 2525-2556. (2023).
6. Yining Wu, Peihan Li, Bin Yan, **Xiaohan Li**, Yongping Huang, Juncong Yuan, Xiang Feng, Caili Dai. A Salt-induced tackifying polymer for enhancing oil recovery in high-salt reservoirs: synthesis, evaluation, and mechanism. *Green Energy & Environment*, in press. (2023).
7. Shangwen Zhou, Dongxiao Zhang, Hongyan Wang, **Xiaohan Li**. A modified BET equation to investigate supercritical methane adsorption mechanisms in shale. *Marine and Petroleum Geology*, 105, 284-292. (2019).

IN PREPARATION

1. **Xiaohan Li**, Paul Ginoux. A new parameterization to separate coarse and fine mode aerosol optical depth at regional and global scale. In prep.
2. **Xiaohan Li**, Fabien Paulot, Paul Ginoux. Development and evaluation of a new multiconfiguration aerosol microphysical module in GFDL's atmospheric model (AM4.0). In prep.
3. **Xiaohan Li**, Wolf Martin, Xiaoli Shen, Zhenfa Zhang, Avram Gold, Jason D. Surrat, Ian C. Bourg, Daniel J. Cziczo, Yue Zhang. Quantifying and parameterizing the impact of phase state on the ice nucleation abilities of organic aerosols. In prep.
4. **Xiaohan Li**, Fabien Paulot, Paul Ginoux. Evaluation of the aerosol number concentration at the global scale based on GFDL's new aerosol microphysics model and near surface observatories. In prep.

5. Paul Ginoux, **Xiaohan Li**, et al. Global-scale attribution of anthropogenic and natural dust sources and their emission rates based on MODIS Deep Blue aerosol products. In prep.

PRESENTATIONS

- *"Parameterizing the impact of phase state on the ice nucleation abilities of organic aerosols"* 12/2024
  American Geophysical Union 2024 Fall Meeting
- *"Molecular dynamics simulations of adsorbed water films on smectite clay particles"* (Oral, **Invited**)
  American Chemical Society Fall Meeting 2024 08/2024
- *"Disjoining pressure in adsorbed water films on smectite clay particles"* (Oral)
  61st Annual Meeting of The Clay Minerals Society and 5th Asian Clay Conference 06/2024
- *"Hygroscopic growth of adsorbed water films on smectite clay particles"* (Oral)
  American Chemical Society Spring Meeting 2024 03/2024
- *"Ongoing effort to implement aerosol microphysics in the GFDL atmospheric model"* (Oral, **Invited**)
  NOAA Geophysical Fluid Dynamics Laboratory Aerosol/Cloud Microphysics Roundtable 03/2024
- *"Water, salt, and organics in nano-aerosol particles: improved understanding of aerosol microphysics from molecular basis"* (Oral, **Invited**)
  McKelvey School of Engineering, University of Washington in St. Louis 04/2023
- *"How does water contribute to new particle formation?"* (Oral)
  American Chemical Society Spring Meeting 2023 03/2023
- *"Aerosol microphysics from molecular understanding to improved representation in climate models"* (Oral)
  NOAA Geophysical Fluid Dynamics Laboratory 02/2023
- *"Molecular dynamics simulations of the microphysics of liquid water in nano-aerosol droplets."* (Oral)
  The 40th Annual Conference of American Association of Aerosol Research 10/2022
- *"Molecular dynamics simulations of the effect of surface charge density and oxidation degree on the colloidal stability of graphene oxide"* (Oral & Poster)
  Goldschmidt Conference 2022 07/2022
- *"Molecular dynamics simulations of water, salt, and organics in nano-aerosol particles"* (Oral)
  American Chemical Society Spring Meeting 2022 03/2022
- *"Molecular dynamics simulations of liquid water microphysics in nano-aerosol droplets"* (Poster)
  American Geophysical Union 2021 Fall Meeting 12/2021
- *"Molecular dynamics (MD) simulation of the microphysics of liquid water in aerosol particles"* (Oral)
  Soft Materials Coffee Hour Seminar, Princeton University 11/2021
- *"Phase-mixing states of secondary organic aerosol: key to aerosol-cloud interactions"* (Oral)
  Environmental Engineering and Water Research Seminar, Princeton University 10/2020
- *"How secondary organic aerosol affects precipitation and radiative forcing"* (Poster)
  American Geophysical Union 2019 Fall Meeting 12/2019

TEACHING AND MENTORING EXPERIENCE

- **Teaching Assistant**. Princeton University Fall 2020
  CEE207: Introduction to Environmental Engineering Fall 2020
  — I hosted three precepts per week, developed weekly quizzes, held office hours, and graded homework.
- **Undergraduate Research Advising**. HMEI Environmental Internship Program 2020 – 2021
  — I identified research topics, developed research questions, designed experiments, and supervised the following students:
  - Yuno Iwasaki, Physics, Class of 2023, Princeton University
    Topics: *Characterizing the microphysics of atmospheric organic aerosols using molecular dynamics simulations*

- George Dickinson, Civil and Environmental Engineering, Class 2023, Princeton University
  Topics: *Molecular dynamics simulations of black carbon-water interactions in the atmosphere*
- Benjamin Henry, Civil and Environmental Engineering, Class 2022, Princeton University
  Topics: *Molecular dynamics simulations of curvature impact on black carbon wettability*

SCIENCE OUTREACH

- **Organizer**. Spring Info Science Event, Science Outreach Program, Princeton University. 04/2024
  Hands-on engaging science event for students in grades 4th through 10th grades to learn and explore science.
- **DEI Committee Member**. Atmospheric and Oceanic Program, Princeton University 2024 – Present
  Promoting more diverse, equitable, and inclusive environment for graduate students and postdocs.

REFERENCE

Ian C. Bourg, bourg@princeton.edu
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Princeton University

Paul Ginoux, paul.ginoux@noaa.gov
Senior Physical Scientist at Geophysical Fluid Dynamics Laboratory
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