Jiarong Wu

Email: jiarong.wu@nyu.edu
Website: jiarong-wu.github.io
Address: Warren Weaver Hall 1123
Phone: (+1) 609-917-8212

Education

Princeton University — Princeton, NJ, USA
Ph.D. in Mechanical and Aerospace Engineering — 2018 - 2023
Graduate certificate in Computational Science and Engineering

Tsinghua University — Beijing, China
B.S. in Mechanical Engineering — 2014 - 2018

Research Experience

Courant Institute of Mathematical Sciences — New York, NY, USA
Postdoctoral Research Associate with Prof. Laure Zanna — 2023/09 - current

- Air-sea flux parameterization in climate models with a combination of physics-based and data-driven methods
- Affiliated with LEAP (Learning the Earth with Artificial Intelligence and Physics) at Columbia University and M2LInES (Multiscale Machine Learning In Coupled Earth System Modeling)

Princeton University — Princeton, NJ, USA
Graduate research assistant advised by Prof. Luc Deike — 2018 - 2023

- Thesis: Ocean Wave Dynamics with High Fidelity Numerical Simulations

Short-term research visits:

National Center for Atmospheric Research (NCAR) — Boulder, CO, USA
Visiting scholar hosted by Climate and Global Dynamics Laboratory (CGD) — 2025/10

- Implementation of data-driven air-sea flux algorithm in Machine Learning Enhanced Community Earth System Model (CESM3-MLe) and stochastic air-sea flux parameterization

Center for Turbulence Research (CTR) — Stanford, CA, USA
Participant (as project lead) of CTR Summer Program 2024 — 2024/06 - 2024/07

- High fidelity two-phase numerical simulations of wind waves

Laboratory of Physical and Spatial Oceanography (LOPS - Ifremer) — Brest, France
Visiting scholar hosted by Dr. Bertrand Chapron — 2023/07 - 2023/08, 2025/07

- Storm-centric swell analysis and modeling; wind wave characteristics for satellite scatterometer signal retrieval

Publications

Submitted (1)

1. Zanna, L., Gregory, W., Perezhogin, P., Sane, A., Zhang, C., Adcroft, A., ... **Wu, J.** (2025). A Framework for Hybrid Physics-AI Coupled Ocean Models. arXiv preprint arXiv:2510.22676.

Published (7)

1. **Wu, J.**, Perezhogin, P., Gagne, D. J., Reichl, B. G., Subramanian, A. C., Thompson E. J., and Zanna, L. (2026). Data-Driven probabilistic air-sea flux parameterization. Geophysical Research Letters. https://doi.org/10.1029/2025GL120472.

2. **Wu, J.**, Popinet, S., Chapron, B., Farrar, J. T., and Deike, L. (2025). Turbulence and energy dissipation from wave breaking. Journal of Physical Oceanography. https://doi.org/10.1175/JPO-D-25-0052.1.

3. Scapin, N., **Wu, J.**, Farrar, J. T., Chapron, B., Popinet, S. and Deike, L., (2025). Momentum fluxes in wind-forced breaking waves. Journal of Fluid Mechanics. https://doi.org/10.1017/jfm.2025.77

4. **Wu, J.**, and Hwang, H.. High-fidelity simulation of boundary layer flow over waves. Proceedings of the 2024 CTR Summer Program.

5. **Wu, J.**, Popinet, S., and Deike, L. (2023). Breaking wave field statistics with a multilayer numerical framework. Journal of Fluid Mechanics. **2023 JFM Emerging Scholars Best Paper Prize Honorable Mention.** https://doi.org/10.1017/jfm.2023.522

6. **Wu, J.**, Popinet, S., and Deike, L. (2022). Revisiting wind wave growth with fully coupled direct numerical simulations. Journal of Fluid Mechanics. https://doi.org/10.1017/jfm.2022.822

7. **Wu, J.** and Deike, L. (2021). Wind wave growth in the viscous regime. Physical Review Fluids. https://doi.org/10.1103/PhysRevFluids.6.094801

Scholarships and Awards

- **Marie Skłodowska-Curie Postdoctoral Fellowships** 2026
- JFM Emerging Scholar Best Paper Prize: Honourable Mention 2023
- Princeton School of Engineering and Applied Science Award for Excellence 2022
- Princeton MAE Britt and Eli Harari Fellowship 2021
- Princeton MAE Second Year Fellowship 2019

Teaching and Mentoring

- **Teaching Assistant** at Princeton University Spring 2023, Fall 2020/2021
  - MAE 501 - Methods of Engineering Analysis I
  - ENV 330/MAE 330 - Ocean Waves
- **Undergrad research mentoring** at Princeton University
  - Lucy Madden, PRISM Summer Program, Summer 2021
  - Sonika Bagchi, Princeton Physics Department Junior and Senior Paper, 2021-2023
  - Yusuf Baig, New York University Computer Science Master Intern, 2025

Service and Volunteering

- Session chair for *Fluxes, Surface Waves, and Physical Processes at the Air-Sea Interface* at OSM 2024
- Reviewer for Journal of Fluid Mechanics, Geophysical Research Letter, Journal of Atmospheric and Oceanic Technology, Journal of Geophysical Research: Machine Learning and Computation, Atmospheric Research
- Member of MAE Climate and Inclusion Committee 2019–2022
  Assist survey, office hour, and department-wise open discussion as a graduate student committee member.
- Volunteer at weekly help sessions of Princeton Research Computing (PICSciE) 2022-2023
  Providing technical supports on software engineering, cluster usage, and visualization related questions.

Workshops and Summer Schools

Boulder Summer School for Condensed Matter and Materials Physics — Boulder, CO
Hydrodynamics Across Scales — July 2022

US CLIVAR Working Group Summer School — Miami, FL
Ocean Uncertainty Quantification — July 2024

Selected talks and Posters

1. Data-Driven probabilistic air-sea flux parameterization, **Invited talk at SMARTIES**, Brown University, Providence (online), 2026
2. Air-sea flux parameterization - a data-driven approach and its online realization, **Keynote speaker at 2026 DRAKKAR workshop**, Grenoble (online), 2026
3. Data-Driven probabilistic air-sea flux parameterization, **Invited talk at Department of Atmospheric and Oceanic Sciences, Fudan University**, Shanghai (online), 2026
4. Data-Driven probabilistic air-sea flux parameterization, **CESM Ocean Model Working Group Meeting**, Boulder, CO, 2025
5. Ocean Wave Dynamics with High Fidelity Numerical Simulations, **Physical Oceanography Dissertation Symposium (PODS)**, Lihue, HI, 2024
6. Data-driven probabilistic air-sea flux model using in-situ direct measurements, **Observing Air-sea Interactions Strategy (OASIS) webinar**, online, 2024
7. Ocean Wave Dynamics with High Fidelity Numerical Simulations, **Invited talk at Hong Kong University of Science and Technology (HKUST)**, Guangzhou, 2023
8. **AGU Ocean Sciences Meeting** - 2020/2022/2024/2026
9. **APS Division of Fluid Dynamics Meeting** - 2019/2020/2021/2022
10. **Wind Waves in the Earth System (WISE) Workshop** - 2022/2023/2025
11. **APS March Meeting** - 2023
12. **Basilisk User Forum** - 2023/2025
13. **International Congress of Theoretical and Applied Mechanics (ICTAM)** - 2021