Jiarong Wu

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Education

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

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

Tsinghua University — Beijing, China
B.S. in Mechanical Engineering, GPA: 90.4/100 — 2014 –2018

Research Experience

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

- Air-sea flux parameterization in climate models with a combination of physics-based and data-driven methods.
- Affliated with LEAP (Learning the Earth with Artificial Intelligence and Physics) center at Columbia University

Center for Turbulence Research (CTR) — Stanford, CA
Participant (as project lead) of CTR Summer Program 2024 — July - August 2024

- 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 — July - August 2023

- Wind wave characteristics for satellite scatterometer signal retrieval.

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

- Thesis: Ocean Wave Dynamics with High Fidelity Numerical Simulations

Tsinghua University — Beijing
Senior thesis advised by Prof. Shuhong Liu — 2017 - 2018

- Cavitation around a bionic hydrofoil with leading-edge tubercles in high speed water tunnel.

Publications

1. **Wu, J.**, Popinet, S., and Deike, L. (2023). Breaking wave field statistics with a multilayer numerical framework. Journal of Fluid Mechanics. DOI: https://doi.org/10.1017/jfm.2023.522

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

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

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

Under preparation

1. **Wu, J.**, Perezhogin, P., Gagne., D.J., Reichl, B., Subramanian, A., and Zanna, L.. Air-sea turbulent fluxes parameterization and uncertainty quantification with a data-driven approach.
2. Scapin, N., **Wu, J.**, Farrar, J.T., Chapron, B., Popinet, S. and Deike, L., 2024. Momentum fluxes in wind-forced breaking waves. Submitted.
3. **Wu, J.**, Popinet, S., Chapron, B., Farrar, J.T., and Deike, L.. Breaking wave-induced turbulence and dissipation.

Scholarships and Awards

- JFM Emerging Scholar Best Paper Prize: Honourable Mention 2024
- 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

Service and Volunteering

- Session chair for *Fluxes, Surface Waves, and Physical Processes at the Air-Sea Interface* at OSM 2024
- 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.

Selected talks and Posters

1. **J. Wu**, "Ocean Wave Dynamics with High Fidelity Numerical Simulations", Physical Oceanography Dissertation Symposium (PODS), Lihue, HI, 2024
2. **J. Wu**, "Data-driven probabilistic air-sea flux model using in-situ direct measurements", Observing Air-sea Interactions Strategy (OASIS) webinar, online, 2024
3. **J. Wu**, invited talk "Ocean Wave Dynamics with High Fidelity Numerical Simulations", Hong Kong University of Science and Technology (HKUST), Guangzhou, 2023
4. **AGU Ocean Sciences Meeting** - 2020/2022/2024
5. **APS Division of Fluid Dynamics Meeting** - 2019/2020/2021/2022
6. **Wind Waves in the Earth System (WISE) Workshop** - 2022/2023
7. **APS March Meeting** - 2023
8. **Basilisk User Forum** - 2023
9. **International Congress of Theoretical and Applied Mechanics (ICTAM)** - 2021