



BROWN

Department of Earth, Environmental & Planetary Sciences, Brown University

E-mail: xinyih@brown.edu

Xinyi Huang

Positions

Postdoctoral Research Associate

Aug. 2025 – present

Department of Earth, Environmental & Planetary Sciences

Brown University, Providence, RI

Advisors: Dr. Baylor Fox-Kemper, Dr. Emanuele Di Lorenzo

Postdoctoral Scholar Research Associate

Aug. 2023 – Jul. 2025

Graduate Aerospace Laboratories, Division of Engineering and Applied Science

Advisor: Dr. Jane Bae

California Institute of Technology, Pasadena, CA

Education

Ph.D. in Mechanical Engineering

Aug. 2018 – May 2023

Department of Mechanical Engineering, College of Engineering

Advisor: Dr. Xiang Yang

The Pennsylvania State University, University Park, PA, USA

Bachelor of Engineering, Tsien Excellence in Education Program

Aug. 2014 – June 2018

Department of Engineering Mechanics, School of Aerospace Engineering

Tsinghua University, Beijing, China

Journal publications

- [Huang, X.](#), Leung, S. C., & Bae, H. J. (2025). Consistency requirement of data-driven subgrid-scale modeling in large-eddy simulation (Under Review)
- [Huang, X.](#), Leung, S. C., Whitmore, M. P., Elnahas, A., & Bae, H. J. (2024). Consistent data-driven subgrid-scale model development for large-eddy simulation . In *Proceedings of the Summer Program* (p. 1).
- [Huang, X.](#), & Li, J. J. L. (2024). The characteristics of the meandering effect in a stratified wake. *Phys. Rev. Fluids*, 10(1), 014602.
- [Huang, X.](#), Chyczewski T., Xia Z., Kunz, R. F., & Yang, X. I. A. (2023). Distilling experience into a physically interpretable recommender system for computational model selection. *Sci. Rep.*, 13, 2225
- [Huang, X.](#), Kunz, R. F., & Yang, X. I. A. (2023). Linear Logistic Regression with Weight Thresholding for Flow Regime Classification of a Stratified Wake. *Theor. Appl. Mech. Lett.*, 100414.
- Jain, N., [Huang, X.](#), Li, J. J. L., Yang, X. I. A. and Kunz, R. F. (2023). An Assessment of Second Moment Closure Modeling for Stratified Wakes Using Direct Numerical Simulations Ensembles. *J. Fluids Eng.*, 145(9).

- Jain, N., Pham, H. T., Huang, X., Sarkar, S., Yang, X., & Kunz, R. (2022). Second Moment Closure Modeling and Direct Numerical Simulation of Stratified Shear Layers. *J. Fluids Eng.*, 144(4), 041102.
- Huang, X., Jain, N., Abkar, M., Kunz, R. F., & Yang, X. I. A. (2021). Determining a priori a RANS model's applicable range via global epistemic uncertainty quantification. *Comput. Fluids*, 230, 105113.
- Huang, X., & Yang, X. I. A. (2021). A Bayesian approach to the mean flow in a channel with small but arbitrarily directional system rotation. *Phys. Fluids*, 33(1), 015103.
- Lv, Y., Huang, X., Yang, X., & Yang, X. I. (2021). Wall-model integrated computational framework for large-eddy simulations of wall-bounded flows. *Phys. Fluids*, 33(12), 125120.
- Yang, X. I. A., Hong, J., Lee, M., & Huang, X. (2021). Grid resolution requirement for resolving rare and high intensity wall-shear stress events in direct numerical simulations. *Phys. Rev. Fluids*, 6(5), 054603.
- Kumar, S. S., Huang, X., Yang, X., & Hong, J. (2021). Three dimensional flow motions in the viscous sublayer. *Theor. Appl. Mech. Lett.*, 11(2), 100239.
- Huang, X., Yang, X. I. A., & Kunz, R. F. (2019). Wall-modeled large-eddy simulations of spanwise rotating turbulent channels—Comparing a physics-based approach and a data-based approach. *Phys. Fluids*, 31(12), 125105.
- Yang, X. I. A., Xu, H. H. A., Huang, X., & Ge, M. W. (2019). Drag forces on sparsely packed cube arrays. *J. Fluid Mech.*, 880, 992-1019.

Experience

Postdoctoral Research Associate

Aug. 2025 – present

Fox-Kemper Research Group for ocean modeling and theory, Brown University, Providence, RI, USA

- Develop benchmarking dataset for emulators of regional ocean modeling.
- Use machine learning techniques to downscale regional ocean models for Narragansett Bay area in 3CRS (New England Community-Driven Coastal Climate Research and Solutions) project.

Postdoctoral Scholar Research Associate

Fall 2023 – Summer 2025

Bae Research Group for computational turbulence, California Institute of Technology, Pasadena, CA, USA

- Analyzed the consistency between the *a priori* test and the *a posteriori* application of data-driven subgrid scale (SGS) model.
- Examined the impact of filtering on modeling in the LES simulation.
- Developed an aligned model between the *a priori* test and the *a posteriori* tests with the application to homogeneous isotropic turbulence with a data-driven approach.

Graduate Research Assistant

Fall 2018 – Spring 2023

Flow Physics and Computational Research Lab, The Pennsylvania State University, University Park, PA, USA

- Focused on the combination of data-driven approach and turbulence research.
Multiple techniques are used for understanding the physics and for modeling, including the neural network, Bayesian optimization, logistic regression, and recommender system.

- Simulated flow under different environments, including with rotation, with stratification and with adverse pressure gradient, in both in-house codes, e.g., LESGO, CharLES, AFiD, NPHASE-PSU and commercial software, e.g., STAR-CCM+.
- Developed and modified in-house CFD codes under high performance computing/message passing interface environment (HPC/MPI) in C/C++ and FORTRAN.
- Designed and generated computational grid (mesh) according to the simulation requirements, including DNS grid, WMLES grid, WRLES grid and RANS grid.
- Explored routes of applying data-driven tools to improving turbulence modeling, from evaluation of the physics and exploration of the parameter space to augmented models and model selection.

Future Faculty Immersive Teaching Program

Fall 2021, Spring 2022

(EDSGN100 instructor of record)

School of Engineering Design, Technology, and Professional Programs, The Pennsylvania State University

- Served as the instructor of record for 3 sections of 3-credit class EDSGN100 on engineering design.
- Closely worked with the teaching team, including other instructors and my TAs, on course improvements.

Graduate Teaching Assistant

Fall 2018 & Fall 2019 (ME300), Fall 2020

(ME201)

Department of Mechanical Engineering, The Pennsylvania State University, University Park, PA, USA

- Graded homework and exams for ME300 (Thermodynamics) and ME201 (Introduction to thermo science);
- Gave review lectures and held office hours for further understanding of the courses.

Visiting student, Department of Mechanical Engineering, The University of Melbourne

Nov. 2017 – Feb. 2018

Undergraduate Visiting Researcher (UGVR) program, Department of Mechanical Engineering, Stanford University

June 2017 – Sep. 2017

Skills

- **Programming languages:** MATLAB, FORTRAN, C/C++, Python, LaTeX; git
- **Software:** (Proficient) STAR-CCM+, Pointwise, Tecplot; (Acquainted) OpenFOAM, Solidworks
- **Experimental Technique:** (Acquainted) Hot wire technique, Particle image velocimetry (PIV)

Professional services

Journal referee for

- *Journal of Fluid Mechanics*
- *Journal of Turbulence*
- *Journal of Fluids Engineering*
- *JFM Rapids*
- *Entropy*

Conference presentations

- Huang, X. (2025). How does wall modeling impact the momentum transfer of the modeled wall turbulence? *Bulletin of the American Physical Society*.
- Huang, X., Leung, S. C., & Bae, J. (2024). Numerical error of explicitly filtered large-eddy simulation for consistent data-driven modeling. *Bulletin of the American Physical Society*.
- Huang, X., Li, J., & Yang, X. (2023). The characteristics of the meandering effect in a stratified wake. *Bulletin of the American Physical Society*.
- Huang, X., Kunz, R., & Yang, X. (2022). Linear logistic regression with weight thresholding for flow regime classification of a stratified wake. *Bulletin of the American Physical Society*.
- Huang, X., Kunz, R., & Yang, X. (2021). Data-driven computational model selection via recommender systems. *Bulletin of the American Physical Society*, 66.
- Huang, X., Jain, N., Kunz, R., & Yang, X. (2020). Epistemic uncertainty quantification of Reynolds stress models. *Bulletin of the American Physical Society*.
- Huang, X., & Yang, X. (2019). Wall-modeled LES of flow around a prolate spheroid at various angles of attack. *Bulletin of the American Physical Society*, 64.