

Education

Ph.D. Student

Aug. 2018 – Est. May 2023

Department of Mechanical 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

First-author journal publications (including under revision)

- Huang, X., Chyczewski T., Xia Z., Kunz, R. F., & Yang, X. I.. Distilling experience into a physically interpretable recommender system for computational model selection. (*Under revision*)
- Huang, X., Kunz, R. F., & Yang, X. I.. Linear Logistic Regression with Weight Thresholding for Flow Regime Classification of a Stratified Wake. (*Accepted*)
- Huang, X., Jain, N., Abkar, M., Kunz, R. F., & Yang, X. I. (2021). Determining a priori a RANS model's applicable range via global epistemic uncertainty quantification. *Computers & 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. *Physics of Fluids*, 33(1), 015103.
- 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. *Physics of Fluids*, 31(12), 125105.

Journal publication with collaborators

- 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. *Journal of Fluids Engineering*, 144(4), 041102.
- Lv, Y., Huang, X., Yang, X., & Yang, X. I. (2021). Wall-model integrated computational framework for large-eddy simulations of wall-bounded flows. *Physics of 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. *Physical Review Fluids*, 6(5), 054603. (**Editors' suggestion**)
- Kumar, S. S., Huang, X., Yang, X., & Hong, J. (2021). Three dimensional flow motions in the viscous sublayer. *Theoretical and Applied Mechanics Letters*, 11(2), 100239.
- Yang, X. I. A., Xu, H. H. A., Huang, X., & Ge, M. W. (2019). Drag forces on sparsely packed cube arrays. *Journal of Fluid Mechanics*, 880, 992-1019.

Experience

Graduate Research Assistant

Fall 2018 - present

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

- Focused on the combination of **machine learning** 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.
Multiple scenarios are explored to extend modeling abilities, including the rotating flow, the stratified wake, and the separated flows.
- 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.
- Simulated flow under different environment, including with rotation, with stratification and adverse pressure gradient, in both in-house codes and commercial software, e.g., STAR-CCM+.
- Explored routes of applying **machine learning** tools to improving turbulence modeling behavior, from evaluation of the physics and exploration of the parameter space, to enhanced models and model selection.

Future Faculty Immersive Teaching Program

Fall 2021, Spring 2022 (EDSGN100)

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 how to be an engineer.
- Closely worked with the teaching team, including other instructors and 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
- **Software:** (Proficient) STAR-CCM+, Pointwise, Tecplot; (Acquainted) OpenFOAM, Solidworks
- **Experimental Technique:** (Acquainted) Hot wire technique, Particle image velocimetry (PIV)

Selected conference presentations

- 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.