Xinyi Huang

Department of Mechanical Engineering, Pennsylvania State University

Tel: +1 (608)-400-3840 | E-mail: xuh128@psu.edu

Education

Ph.D. Candidate   Aug. 2018 – Present

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

Journal publications

- Yang, X. I. A., Hong, J., Lee, M., & Huang, X. L. D. (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). Meandering motions within the viscous sublayer. *Theoretical and Applied Mechanics Letters*, 100239.

- Huang, X. L. D., & 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.

- Yang, X. I. A., Xu, H. H. A., Huang, X. L. D., & Ge, M. W. (2019). Drag forces on sparsely packed cube arrays. *Journal of Fluid Mechanics*, *880*, 992-1019.

- Huang, X. L. D., 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 (under revision)

- Huang, X., Jain, N., Abkar, M., Kunz, R., & Yang, X. (2021). Determining a priori a RANS model's applicable range via global epistemic uncertainty quantification. *arXiv preprint arXiv:2103.00084*.

- Jain, N., Pham H., Huang X., Sarkar S., Yang X., & Kunz R. (2021) Second Moment Closure Modeling and DNS of Stratified Shear Layers. *Accepted by Journal of Fluids Engineering*

Conference presentations

- Jain, N., Huang, X., Pham, H., Yang, X., Sarkar, S., & Kunz, R. (2020). Reynolds Stress/Flux/Variance Modeling and DNS of Stratified Shear Layers. *Bulletin of the American Physical Society*.

- Huang, X., Jain, N., Kunz, R., & Yang, X. (2020). Epistemic uncertainty quantification of Reynolds stress models. *Bulletin of the American Physical Society*.

- Yang, X., Huang, X., & Abkar, M. (2020). A Bayesian approach to flow in a channel with small but arbitrarily directional system rotation. *Bulletin of the American Physical Society*.

- Sankar, S. K., <u>Huang, X.</u>, Yang, X., & Hong, J. (2020). Structures in the viscous sublayer and the prediction of wall shear stress. *Bulletin of the American Physical Society*.

- <u>Huang, X.</u>, & Yang, X. (2019). Wall-modeled LES of flow around a prolate spheroid at various angles of attack. *Bulletin of the American Physical Society*, *64*.

- Yang, X., & <u>Huang, X.</u> (2019). Comparing a data-based approach and a physics-based approach for wall modeled LES of flow in a spanwise rotating channel. *Bulletin of the American Physical Society*, *64*.

Experience

Graduate Research Assistant   Fall 2018 - present

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

- ➢ Combined **machine learning** with turbulence research, including application of feed-forward neural network to wall modeling, application of a Bayesian method to explore the law of the wall, uncertainty quantification of high-dimensional parameter space and recommendation system of RANS modeling;

- ➢ 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) based on the flow configuration;

- ➢ Simulated flow under different environment, including rotation and stratification, in both in-house codes and commercial software, e.g., STAR-CCM+;

- ➢ Developed physical understanding and models of the flow and built **machine learning** framework for the process.

Graduate Teaching Assistant   Fall 2018 (ME300), 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

<p align="right" style="color:gray">Only top students in Tsinghua University are picked.</p>

Skills

- **Programming languages**: C/C++ (Object oriented programming, HPC/MPI), FORTRAN (Scientific computing, HPC/MPI), Python (Machine learning toolbox), MATLAB (proficient, machine learning toolbox)

- **Software**: (Proficient) STAR-CCM+, Pointwise, Tecplot; (Acquainted) OpenFOAM, Solidworks, ICEM CFD

- **Experimental Technique**: (Acquainted) Hot wire technique, Particle image velocimetry (PIV)