Xiao He

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EDUCATION

Imperial College London	**10/2018 – 09/2022**
Ph.D. in Mechanical Engineering	*London, UK*
Tsinghua University	**08/2015 – 07/2018**
M.S. in Power Engineering and Engineering Thermophysics - **Rank: 5%**	*Beijing, China*
Tsinghua University	**08/2011 – 07/2015**
B.E. (Hons) in Vehicle Engineering - **Rank: 5%**	*Beijing, China*

AWARDS AND HONORS

Great Britain China Educational Trust Grant (35/year in UK)	**2021**
Henry Lester Trust Grant (35/year in UK)	**2021**
Young Engineer Turbo Expo Participation Award (10/year globally)	**2020,2021**
Student Advisory Committee Travel Award (20/year globally)	**2019**
President's PhD Scholarship (50/year in Imperial College)	**2018**
National Scholarship (top 1% in Department)	**2017**
Japan Student Services Organization Scholarship (20/year globally)	**2017**
Overall Excellent Scholarship (top 5% in Department)	**2016**
Honored Graduate Award (top 1% in Department)	**2015**
Best Undergraduate Thesis Award (top 3% in Department)	**2015**
Academic Excellent Scholarship (top 30% in Department)	**2012,2013,2014**
1st Prize in the 29th National College Student Physics Competition (Beijing)	**2012**
1st Prize in the 27th National High School Student Physics Competition (Hunan)	**2010**

RESEARCH EXPERIENCE

Data-Driven Turbulence Modeling for Compressor Flows	**10/2018 – 09/2022**
President's PhD Scholar with Prof. Mehdi Vahdati, Imperial College	*London, UK*

- Incorporated explainable machine learning in Python to develop a data-driven turbulence model.
- Developed hybrid RANS/LES branch of the in-house solver HADES in Fortran.
- Developed and maintained turbomachinery features of the in-house solver HADES in Fortran.
- Analyzed TB-scale turbulence data by in-house Python scripts of SPOD and anisotropy calculator.
- Employed Python and Linux bash to build a metamodel-based UQ workflow.

Surge and Rotating Stall in Centrifugal Compressors	**08/2015 – 07/2018**
Graduate Research Assistant advised by Prof. Xinqian Zheng, Tsinghua	*Beijing, China*

- Designed similitude-based model test for centrifugal compressors with and without casing treatment.
- Measured compressor performance on a turbocharger rig and dynamic wall pressure with Kulite probes.
- Performed URANS simulation for compressor stall and proposed a phenomenological stall onset model.

Bionic Skin Friction Reduction in Turbulent Boundary Layer	**07/2017 – 09/2017**
Visiting Graduate Research Assistant advised by Prof. Hiroto Tanaka, Tokyo Tech	*Tokyo, Japan*

- Skin friction reduction was achieved in a numerical water tunnel by the penguin-inspired micro-structure

Transonic Flow in Centrifugal Compressors	**09/2013 – 06/2015**
Undergraduate Research Assistant advised by Prof. Xinqian Zheng, Tsinghua	*Beijing, China*

- Applied genetic algorithm and artificial neural network to optimize the 3D blade shape.

TEACHING AND MENTORING EXPERIENCE

Graduate Teaching Assistant, Fluid Mechanics (undergraduate) | Imperial College   **10/2019 – 06/2021**
- Led tutorial sessions in a class size of 15; wrote and graded exams.

Mentor for Master Thesis and Research Internship | Imperial College   **01/2020 – 06/2021**
- Mentored three students with weekly supports in six months each.

Mentor for Undergraduate Thesis | Tsinghua   **01/2016 – 06/2018**
- Mentored three students with weekly supports in six months each.

INVITED TALKS

1. "Data-Driven RANS Turbulence Modeling for Compressor Stall" Seminar talk at Institute of Gas Turbines and Aerospace Propulsion (GLR), Department of Mechanical Engineering, Technische Universität Darmstadt, June 2022.
2. "Data-Driven RANS Turbulence Modeling for Compressor Stall" Seminar talk at Institute of Turbomachinery, School of Mechanical Engineering, Shanghai Jiao Tong University, April 2022.

SELECTED PUBLICATIONS

I have authored/co-authored 14 peer-reviewed journal papers and 9 peer-reviewed conference papers. My Google Scholar statistics are: Citation$\geq$162, h-index$\geq$9; my Publons statistics are: Citation$\geq$109, h-index$\geq$6. Selected publication list is as follows. (* corresponding author; † equal contribution)

1. **He, X.***, Tan, J., Rigas, G., and Vahdati, M., "On the Explainability of Machine-Learning-Assisted Turbulence Modeling for Transonic Flows," 2022, International Journal of Heat and Fluid Flow. (under second-round review). [preprint]
2. **He, X.***, Zhao, F., and Vahdati, M., "A Turbo-Oriented Data-Driven Modification to the Spalart-Allmaras Turbulence Model," Proceedings of the ASME Turbo Expo 2022: Turbomachinery Technical Conference and Exposition. Volume 2D: Turbomachinery. Rotterdam, Netherlands. June 13–17, 2022. ASME Paper No. GT2022-80456. ASME IGTI Committee Best Paper Finalist (accepted). [preprint]
3. **He, X.***, Zhao, F., and Vahdati, M., "Detached Eddy Simulation: Recent Development and Application to Compressor Tip Leakage Flow," ASME Journal of Turbomachinery, 2022, 144(1), 011009. [preprint] [doi]
4. **He, X.***, Fang, Z., Rigas, G., and Vahdati, M., "Spectral Proper Orthogonal Decomposition of Compressor Tip Leakage Flow," Physics of Fluids, 2021, 33(10), 105105. [preprint] [doi]
5. **He, X.***, Zhao, F., and Vahdati, M., "Uncertainty Quantification of Spalart-Allmaras Turbulence Model Coefficients for Compressor Stall," ASME Journal of Turbomachinery, 2021, 143(8), 081007. [preprint] [doi]

SOFTWARES

HADES: an unstructured finite volume CFD solver for internal and external flows. The solver is featured by advanced turbulence modeling capabilities, turbomachinery capabilities and multiphase flow capabilities.

SPOD Python: a Pythonic realization of SPOD and its applications to some fluid mechanics problems.

TurbAna: a Python toolkit that calculates and visualizes turbulence anisotropy and turbulent viscosity from Reynolds stress components.

ACADEMIC SERVICE

Referee for Journals and Conferences

ASME Journal of Turbomachinery, ASME Journal of Fluids Engineering, Aerospace Science and Technology, International Journal of Mechanical Sciences, IMechE Journal of Power and Energy, IMechE Journal of Automobile Engineering, IMechE Journal of Aerospace Engineering, Chinese Journal of Aeronautics, Advances in Mechanical Engineering, ASME Turbo Expo, GPPS Conference.

Conference Session Organizer

1st GPPS Turbomachinery CFD Workshop, 2nd GPPS Turbomachinery CFD Workshop