Xiao He

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RESEARCH OVERVIEW

My research interest in general involves the field of fluid mechanics, data science, and their applications to turbomachinery. I am currently working on turbulence modeling for compressor applications. My former research focused on compressor aerodynamics.

EDUCATION

09/2018 - present	***Imperial College London***	Department of Mechanical Engineering	Doctor of Philosophy
	Topic: Data-Driven Turbulence Modeling		
	Advisor: Prof. Mehdi Vahdati, Prof. Ricardo Martinez-Botas		
08/2015 – 07/2018	***Tsinghua University***	Department of Automotive Engineering	Master of Science
	GPA: 3.6/4.0, Rank: 3/60, Topic: Centrifugal Compressor Flow Instability		
	Advisor: Prof. Xinqian Zheng		
08/2011 – 07/2015	***Tsinghua University***	Department of Automotive Engineering	Bachelor of Engineering
	GPA: 91/100, Rank: 4/74, Honored Graduate		

SELECTED AWARDS AND HONORS

10/2020	Henry Lester Trust Grant	Henry Lester Trust
06/2020	Young Engineer Turbo Expo Participation Award	ASME IGTI
06/2019	Student Advisory Committee Travel Award	ASME IGTI
10/2018	President's PhD Scholarship	Imperial College London
12/2017	Tsinghua-IHI Scholarship	IHI Corporation
11/2017	National Scholarship	Ministry of Education of China
07/2017	Japan Student Services Organization Scholarship	Tokyo Institute of Technology
07/2015	Honored Graduate Award	Ministry of Education of China
07/2015	Excellent Bachelor Thesis Award	Tsinghua University
12/2012	1st Prize in the 29th National College Student Physics Competition	Beijing Physics Society
11/2010	1st Prize in the 27th National High School Student Physics Competition	Chinese Physical Society

TEACHING AND TUTORING EXPERIENCE

Graduate Teaching Assistant

10/2019 – present **Fluid Mechanics 2** (MECH95003, Imperial)

Tutor for Master Theses / Undergraduate Theses / Research Intern

07/2020 – present	**Zhou Fang** (B.E., XJTU, co-supervised with Prof. Mehdi Vahdati)
	Research intern: Reduced Order Model of RANS Using Mode Decomposition and Machine Learning
01/2020 – 06/2020	**Jianheng Tan** (M.E., Imperial, co-supervised with Prof. Mehdi Vahdati)
	Master thesis: RANS Turbulence Model Enhancement Using Machine Learning
01/2018 – 06/2018	**Zitian Niu** (B.E., USTB, co-supervised with Prof. Xinqian Zheng)
	Bachelor thesis: Vaned Diffuser for Centrifugal Compressors
01/2017 – 06/2017	**Wenchao Zhang** (B.E., Tsinghua, co-supervised with Prof. Xinqian Zheng)
	Bachelor thesis: Synthetic Jet for Centrifugal Compressors
01/2016 – 06/2016	**Jie Wei** (B.E., Tsinghua, co-supervised with Prof. Xinqian Zheng)
	Bachelor thesis: Tandem Diffuser for Centrifugal Compressors

SELECTED PUBLICATIONS (*: corresponding author)

Journal Papers

J1. **He, X.*,** Zhao, F., and Vahdati, M., "Uncertainty Quantification of Spalart-Allmaras Turbulence Model Coefficients for Compressor Stall," ASME Journal of Turbomachinery, 2020. (accepted)

J2. **He, X.*,** Zhao, F., and Vahdati, M., "Uncertainty Quantification of Spalart-Allmaras Turbulence Model Coefficients for Simplified Compressor Flow Features," ASME Journal of Fluids Engineering, 2020, 142(9), 091501.

J3. Zhang, W., **He, X.,** Wang, B., Sun, Z., and Zheng, X., "Stability Improvement of a High Pressure Ratio Centrifugal Compressor by Flow Injection," ASCE Journal of Aerospace Engineering, 2020, 33(6), 04020072.

J4. Zou, W., **He, X.,** Zhang, W., Niu, Z., and Zheng, X., "Roles of Vanes in Diffuser on Stability of Centrifugal Compressor," IMechE, Part G: Journal of Aerospace Engineering, 2019, 233(14), 5380-5392.

J5. **He, X.,** and Zheng, X., "Roles and Mechanisms of Casing Treatment on Different Scales of Flow Instability in High Pressure Ratio Centrifugal Compressors," Aerospace Science and Technology, 2019, 84, 734-746.

J6. **He, X.,** and Zheng, X., "Flow Instability Evolution in High Pressure Ratio Centrifugal Compressor with Vaned Diffuser," Experimental Thermal and Fluid Science, 2018, 98, 719-730.

J7. **He, X.,** and Zheng, X., "Performance Improvement of Transonic Centrifugal Compressors by Optimization of Complex Three-Dimensional Features," IMechE, Part G: Journal of Aerospace Engineering, 2017, 231(14), 2723-2738.

J8. **He, X.,** and Zheng, X., "Mechanisms of Sweep on the Performance of Transonic Centrifugal Compressor Impellers," Applied Sciences, 2017, 7(10), 1081.

J9. **He, X.,** and Zheng, X., "Mechanisms of Lean on the Performance of Transonic Centrifugal Compressor Impellers," AIAA Journal of Propulsion and Power, 2016, 32(5), 1220-1229.

Conference Proceedings

C1. Tan, J., **He, X.***, Vahdati, M., Rigas, G., "Machine Learning Assisted Turbulence Modelling for Transonic Flows," ETC Paper No. ETC2021-490. (under review)

C2. **He, X.*,** Fang, Z., Vahdati, M., Rigas, G., "Spectral Proper Orthogonal Decomposition of Compressor Tip Leakage Flow," ETC Paper No. ETC2021-491. (under review)

C3. **He, X.*,** Zhao, F., and Vahdati, M., "Evaluation of Spalart-Allmaras Turbulence Model Forms for a Transonic Axial Compressor," GPPS Paper No. GPPS-CH-2020-0013.

C4. **He, X.*,** Zhao, F., and Vahdati, M., "Uncertainty Quantification of Spalart-Allmaras Turbulence Model Coefficients for Compressor Stall," ASME Paper No. GT2020-15014. Recommended for Journal Publication.

C5. **He, X.*,** Zhao, F., and Vahdati, M., "Machine Learning Uncertainty Quantification of Spalart-Allmaras Turbulence Model for Compressors," GPPS Paper No. 2019-BJ-0050. Recommended for Journal Publication.

C6. **He, X.,** Zheng, X., Wei, J., and Zeng, H., "Investigation of Vaned Diffuser Splitters on the Performance and Flow Control of High Pressure Ratio Centrifugal Compressors," ASME Paper No. GT2016-56255.

Patent

P1. Zheng, X., Zhu, D., **He, X.,** Lin, Y., and Zhang, W., "Internal Combustion Engine System," 2018, Chinese Patent No. CN108167063A.

Poster

O1. **He, X.*,** Zhao, F., and Vahdati, M., "Towards Improved Prediction of Compressor Flow by Uncertainty Quantification of Spalart-Allmaras Turbulence Model," ASME Poster No. GT2019-92244. People's Choice Best Poster Award.

PROFESSIONAL SERVICES

Referee for Journals

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
Advances in Mechanical Engineering

Referee for Conferences

ASME Turbo Expo
GPPS Conference

Membership

ASME (ID: 000101977824)
AIAA (ID: 937472)

MISCELLANEOUS

Homeless animal charity volunteer; Amateur hiker