

Di Zhou

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Education

University of Notre Dame

Ph.D. Candidate in Aerospace & Mechanical Engineering | GPA: 4.00/4.00

Advisor: Dr. Meng Wang

Thesis title: Computational analysis of noise from a rotor ingesting turbulent boundary layer on a body of revolution

Research Interests: turbulence, computational fluid dynamics, aeroacoustics

Notre Dame, IN

Expected Dec. 2021

Beihang University

M.S. Power Engineering and Engineering Thermophysics | GPA: 3.88/4.00

Advisor: Dr. Xiaofeng Sun

Thesis title: Multi-modal broadband noise reduction by multiple cavity resonance liner

Beijing, China

Jan. 2016

Northwestern Polytechnical University

B.E. Flight Vehicle Propulsion Engineering | GPA: 91.19/100 (Top 2/140)

Xi'an, China

July 2013

Research Experience

University of Notre Dame, Institute for Flow Physics and Control

Graduate Research Assistant

Notre dame, IN

Aug. 2016 – Present

- Conducted large-eddy simulations (LES) of flow over a body of revolution and analyzed the effects of pressure gradient and curvature on the evolution of turbulent boundary layer.
- Computed the noise of a rotor ingesting a thick axisymmetric boundary layer using LES and the Ffowcs Williams-Hawkings equation, and analyzed the sound generation mechanisms.
- Implemented several parallel modules in a LES code including an efficient Poisson solver, wall model and turbulent boundary layer inflow generator.
- Conducted RANS simulations of flow over a body of revolution with different geometries and flow conditions to assist the experimental design of collaborators at Virginia Tech.

Beihang University, Fluid and Acoustic Engineering Laboratory

Graduate Research Assistant

Beijing, China

Sept. 2013 – July 2016

- Developed an analytical model to describe sound generation by non-synchronously oscillating rotor blades in an annular duct, conducted experiments to verify the model, and analyzed frequency and modal properties of the sound.
- Developed an analytical model to investigate the features of multiple cavity resonance liner for absorbing higher-order duct modes, conducted experiments to validate the model, and investigated the performance of the liner.

Northwestern Polytechnical University, School of Power and Energy

Undergraduate Research Assistant

Xi'an, China

Sept. 2012 – July 2013

- Designed mechanical model of three bearing swivel nozzle using SolidWorks.
- Conducted two-dimensional RANS simulations on the flow inside the nozzle using Ansys Fluent.
- Carried out thrust and temperature tests of the designed nozzle.

Publications

Journal papers

- **Zhou, D.**, Wang, K. & Wang, M., Space-time characteristics of wall-pressure fluctuations beneath an axisymmetric turbulent boundary layer with adverse pressure gradient. (*In preparation*)
- **Zhou, D.**, Wang, K. & Wang, M., Evolution of a non-equilibrium turbulent boundary layer on the tail cone of a body of revolution under strong adverse pressure gradient. (*In preparation*)
- **Zhou, D.**, Wang, X., Jing, X. & Sun, X., Acoustic properties of multiple cavity resonance liner for absorbing higher-order duct modes. *The Journal of the Acoustical Society of America*, 140 (2016), pp. 1251–1267.
- **Zhou, D.**, Wang, X., Chen, J., Jing, X. & Sun, X., Sound generation by non-synchronously oscillating rotor blades in turbomachinery. *Journal of Sound and Vibration*, 355 (2015), pp. 150–171.
- **Zhou, D.**, Wang, X., Chen, J., Jing, X. & Sun, X., Investigation of sound generation by nonsynchronously vibrating rotor blades. *Acta Aeronautica et Astronautica Sinica*, 36 (2015), pp. 737–748.

Conference papers

- **Zhou, D.**, Wang, K. & Wang, M., Computation of rotor noise generation in a thick axisymmetric turbulent boundary layer. *AIAA AVIATION 2021 FORUM*, Aug. 2021 (*accepted*).
- **Zhou, D.**, Wang, K. & Wang, M., Large-Eddy simulation of an axisymmetric boundary layer on a body of revolution, AIAA 2020-2989. *AIAA AVIATION 2020 FORUM*, June 2020.
- **Zhou, D.**, Wang, X. & Sun, X., Investigation on the broadband noise absorption performance of multiple cavity resonance liner. *The 22nd International Congress on Sound and Vibration*, July 2015.
- Wang, X., **Zhou, D.** & Sun, X., Investigation on effect of rotor blades on the sound propagation. *The 22nd International Congress on Sound and Vibration*, July 2015.
- Zeng, Z., **Zhou, D.** & Wang, X., Experimental research on the upstream propagating rotor-stator interaction noise of axial compressor. *Western China Symposium for Acoustic Technology 2015*, July 2015.

Presentations

- **Zhou, D.**, Computation of rotor noise generation in a thick axisymmetric turbulent boundary layer. *AIAA AVIATION 2021 FORUM*, Aug. 2021. (*virtual*)
- **Zhou, D.**, Large-Eddy simulation of an axisymmetric boundary layer on a body of revolution. *AIAA AVIATION 2020 FORUM*, June 2020. (*virtual*)
- **Zhou, D.**, Large-Eddy simulation of turbulent flow over a body of revolution. *72nd Annual Meeting of the APS Division of Fluid Dynamics*, Nov. 2019, Seattle, Washington.
- **Zhou, D.**, Investigation on the broadband noise absorption performance of multiple cavity resonance liner. *The 22nd International Congress on Sound and Vibration*, July 2015, Florence, Italy.

Honors & Awards

- CRC Award for Computational Sciences and Visualization University of Notre Dame (2021)
- Striving for Excellence in College and University Teaching Certificate University of Notre Dame (2021)
- Notebaert Professional Development Award University of Notre Dame (2019)
- Graduate Student Union Conference Presentation Grant University of Notre Dame (2019)
- Outstanding Graduate Student Teaching Awards University of Notre Dame (2018)
- Excellent M.S. Thesis Beihang University (2016)
- National Scholarship for Graduate Students Ministry of Education of China (2015)
- Excellent Graduates Award Northwestern Polytechnical University (2013)
- National Scholarship for Undergraduate Students Ministry of Education of China (2011)
- Merit Student & the First Prize Scholarship Northwestern Polytechnical University (2009–2013, 4 times)

Teaching & Mentoring Experience

University of Notre Dame, Department of Aerospace and Mechanical Engineering **Notre Dame, IN**
Teaching Assistant for various courses Aug. 2016–May 2020

- Graduate-level: Aeroacoustics, Numerical Methods
- Undergrad-level: Computational Fluid Dynamics, Fluid Mechanics, Introduction to Engineering Computing, Orbital and Space Dynamics

Beihang University, School of Energy and Power Engineering **Beijing, China**

- Undergraduate research mentor of Zhibin Li Feb. 2016–June 2016
- Undergraduate research mentor of Yinhui Shang Feb. 2016–June 2016
- Undergraduate research mentor of Zhangming Zeng Feb. 2015–June 2015

Skills

Proficient: Fortran, Matlab, C/C++, Tecplot, Pointwise, Ansys Fluent, \LaTeX , SolidWorks

Experienced: Mathematica, R, Python, ParaView, LabVIEW, Visual Basic

Professional Memberships

The American Physical Society 2018 - Present
The American Institute of Aeronautics and Astronautics 2018 - Present