

Xuqi Zhang

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Education

Southern University of Science and Technology

Master of Mechanics, Department of Mechanics and Aerospace Engineering, 3.6/4.0

Sep 2022 - Present

Shenzhen, China

Xiangtan University

Bachelor of Engineering (Honored Graduate), Department of Mechanical Engineering, Rank: 4/63

Sep 2018 - Jun 2022

Xiangtan, China

Core courses

- Advanced Mathematics (A)
- Advanced Physics (A)
- Linear Algebra (A-)
- Probability (A)
- Engineering Mechanics (A)
- Applied Mathematics (A-)
- Aeroacoustics (A-)
- Continuum Mechanics (A-)
- Turbulence (B+)

Publications

- **Xuqi Zhang**, Reza Maryami, Yu Liu, and Lian Gan. "Experimental study on flow characteristics and noise generation of polygonal cylinders." In 30th AIAA/CEAS Aeroacoustics Conference (2024), p. 3120. 2024.
- **Xuqi Zhang**, Yu Liu. "Experimental study of aerodynamic noise from polygonal cylinders." Acta Aeronautica et Astronautica Sinica (in Chinese), doi: 10.7527/S1000-6893.2024.30292.
- Jing Guo, Reza Maryami, Guanqing Liu, Xiaoning Wang, **Xuqi Zhang**, and Yu Liu. "Aeroacoustic Properties of Flatback Airfoil at Low Angles of Attack." In 30th AIAA/CEAS Aeroacoustics Conference (2024), p. 3168. 2024.
- **Xuqi Zhang**, Reza Maryami, Lian Gan, Yu Liu. "Experimental study of aerodynamic noise of flow around a heptagonal cylinder." (In preparation)
- Hao Cheng, **Xuqi Zhang**, Yu Liu, Xin Wen, Lian Gan. "Flow and tonal-noise control of circular cylinder using fish-scale like kirigami sheets." (In preparation)

Conference Presentations

- The 30th AIAA/CEAS Aeroacoustics Conference, Rome, Italy. Jun 2024
- The 13th National Conference on Fluid Mechanics, Harbin, China. Aug 2024

Patents

- Liang Su (supervisor), **Xuqi Zhang**, Muyang Ruan, et al. "A transmission adjustment mechanism for a multi-trajectory thermal energy car". CN113147382B. 2022-07-01.
- Liang Su (supervisor), Muyang Ruan, **Xuqi Zhang**, et al. "A new welding rod insulation bucket with phase change materials". CN113184387B. 2022-05-17.

Projects

Aerodynamic noise mechanism of flow around polygonal cylinders (Main project) Sep 2022 – Present

Southern University of Science and Technology

Shenzhen, China

- **Task:** Investigated the aeroacoustic characteristics of flow around polygonal cylinders in an anechoic wind tunnel. Analyzed the flow field to elucidate the mechanism behind the dual-peak phenomenon in the noise spectra of a heptagonal cylinder.
- **Experiment:** Led far-field noise measurements, surface pressure measurements, and Particle Image Velocimetry (PIV).
- **Method:** Employed Power Spectral Density (PSD), Continuous Wavelet Transform (CWT), Spectral Proper Orthogonal Decomposition (SPOD), Dynamic Mode Decomposition (DMD), cross-correlation, and vortex identification using phase-averaged data and image erosion techniques.
- **Ability:** Enhanced proficiency in aerodynamic and aeroacoustic analysis; acquired deep knowledge of flow-induced noise mechanisms and vortex structures behind cylinders; gained extensive experience in mode decomposition methods.

Fluid control by fish-scale sheets (Contributed)

Sep 2023 – Nov 2023

Southern University of Science and Technology

Shenzhen, China

- **Task:** Investigated the impact of fish-scale sheets on disturbing the separation of the shear layer from a circular cylinder.
- **Duty:** Performed PIV experiments and assisted with far-field noise measurements; supported the design and manufacturing of experimental models.
- **Ability:** Acquired knowledge of passive flow control methods based on bionic structures; developed strong experimental skills related to aerodynamic testing.

Fluid control by blunt trailing edge blowing (Contributed)

Nov 2022

Southern University of Science and Technology

Shenzhen, China

- **Task:** Examined the effect of controlled blowing on the wake behind a blunt trailing edge, relevant to wind generator applications.
- **Duty:** Assisted with PIV experiments and surface pressure measurements.
- **Ability:** Gained knowledge of active flow control methods using controlled blowing techniques.

Alcohol-powered Car (Competition)

Feb 2020 – Aug 2021

Xiangtan University

Xiangtan, China

- **Organizer:** Ministry of Education of the People's Republic of China
- **Task:** Designed a tracing car that burns alcohol and navigates obstacles using cams, without electronic hardware.
- **Duty:** Led the competition team; responsible for the manufacturing process, cam design, and tuning of the Stirling engine.
- **Ability:** Received comprehensive training in competition, including leadership, various manufacturing techniques, cam algorithm design using MATLAB, and knowledge of Stirling engines.

Phase change material insulation bucket (Competition)

Feb 2021 – Aug 2021

Xiangtan University

Xiangtan, China

- **Organizer:** Chinese Mechanical Engineering Society
- **Task:** Developed innovative designs to improve the working environment; designed a welding rod insulation bucket using phase change materials to enhance heat retention.
- **Duty:** Led the design of the bucket using SolidWorks, managed the manufacturing process, and wrote the patent.
- **Ability:** Received extensive training in 3D modeling, phase change material behavior, and technical writing for patent applications.

Skills

Experimental Technique: (Proficient) Particle image velocimetry (PIV), Far-field & Surface noise measurement, Wind tunnel; (Acquainted) Balance measurement.

CFD software: (Acquainted) STAR-CCM+, ANSYS fluent.

Programming: (Proficient) MATLAB; (Acquainted) Python, LaTeX.

Mechanical Design: (Proficient) SolidWorks, Creo, AutoCAD.

Fabrication: (Proficient) 3D printing, laser cutter, hand tools; (Acquainted) lathe, mill, soldering.

Experience

Conference Assistant

Jan 2024

- Assistant at the 2024 Symposium on Advances in Aeroacoustics Research in China.

Graduate Teaching Assistant (Aeroacoustics)

Fall 2023

- Graded homework and exams for MAE5017;
- Gave assignment lectures and held office hours for further understanding of the courses.

Assistant Undergraduate Counselor

Sep 2020 – Jun 2021

- Provided consultations about assignments and lives for first-year students.

Volunteer Teacher

Aug 2020

- Organized college students to volunteer in rural villages as teachers;
- Taught physics to junior high students.

Honors & Awards

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| • National Scholarship (2.5%) | Nov 2024 |
| • Honored Graduated Student of Xiangtan City (2%) | May 2022 |
| • Honored Graduated Student of Xiangtan University | May 2022 |
| • Jingdong Scholarship of Xiangtan University (1%) | Nov 2021 |
| • First Prize Award in the Chinese National Undergraduate Engineering Training Integration Ability Competition (National Award) | Nov 2021 |
| • First Prize Award in the 12th Chinese National Competition of Innovation and Creation in Mechanical Engineering (National Award) | Aug 2021 |
| • Humin Scholarship of Xiangtan University (5%) | Dec 2020 |
| • First Prize Award Undergraduate Scholarship of Xiangtan University | Nov 2021, 2020 |

Referees

Yu Liu, Ph.D.: Associate professor, Department of Mechanics and Aerospace Engineering, Southern University of Science and Technology, liuy@sustech.edu.cn.

Lian Gan, Ph.D.: Associate professor, Department of Engineering, Durham University, lian.gan@durham.ac.uk.