Haobo Zhao

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EDUCATION

Johns Hopkins University, Baltimore, MD *Sep. 2023 - Present*
Master in Mechanical Engineering
GPA: 3.86/4.0
Advisor: Dr. Rajat Mittal and Dr. Jung-Hee Seo

Southern Illinois University, Carbondale, IL *2022-2023*
B.S. in Aviation Technologies (Dual Degree with SAU)
GPA: 4.0/4.0
Graduated Magna cum Laude, Dean's List: Spring 2022, Fall 2022

Shenyang Aerospace University, Shenyang, China *2019-2023*
Bachelor in Aircraft Propulsion Engineering
GPA: 3.8/4.0
National Scholarship (2021, top 1% in Department)
SAU First Class Scholarship (Fall 2020, Fall 2021, Spring 2022)

RESEARCH INTERESTS

Computational Fluid Dynamics (CFD), Multiphase Flows, Biological Flows, Immersed Boundary Methods, Multi-Physics Modeling

RESEARCH EXPERIENCE

- **Johns Hopkins University** *Sep. 2023 - Present*
  Master Thesis (Advisor: Dr. Rajat Mittal, Dr. Jung-Hee Seo) – Department of Mechanical Engineering
  - Developed an imaging data-based CFD model of the pancreatic duct (PD) using the CFX solver, validated against clinical data.
  - Created a pipeline for generating patient-specific PD models using cine-MRI data.
  - Formulated a theoretical flow model to predict pressure variations along the PD.
  - Simulated PD flow mechanisms and correlated pressure drop with ERCP-related pain scores.
- **Shenyang Aerospace University** *Sep. 2021 - Dec. 2021*
  Project: Oil Tank Movement Simulation (Advisor: Dr. Wei Sha) – Department of Aerospace Engineering
  - Conducted CFD simulations of oil-gas mixture behavior in a moving tank under various flight conditions.

- Assessed the impact of flight maneuvers on fluid stability for safety evaluations.

- **Southern Illinois University** *Jan. 2022 - May. 2022*
  Urban UAV System (Advisor: Thomas Roy) – Department of Aviation Technologies
  - Designed a truck-based UAS network for extended range through mid-route cargo exchange and power replenishment.
  - Developed a modular platform for universal UAS takeoff, landing, and maintenance.
  - Implemented dynamic route planning to optimize UAS operations and logistics.

ENGINEERING PROJECTS

Adaptive Multi-bypass Propulsion System *Team Leader, May 2022*

- Proposed an aero-engine improvement plan for a multi-electric design, focusing on power generation and energy efficiency.
- Integrated an adaptive three-bypass system with the XA100 prototype, enhancing heat management and stealth.

Electromagnetic Flowmeter Design *Team Leader, September 2021*

- Designed and tested an electromagnetic flowmeter for conductive media, addressing signal amplification and interference for accurate measurement.

Power Allocation Planning in Time Trials (2022 MCM/ICM) *Paper Writer & Programmer, February 2022*

- Developed an OmPD model for optimizing power curves and energy distribution in time trials, published in Heilongjiang Science.

HONORS AND AWARDS

Major Honors:

- **National Scholarship (2021)**: Awarded to top 1% in department for academic excellence.
- **First Prize, National Mathematics Competition (China, 2020)**: Top 8% of participants.
- **Third Prize, Mechanics Competition of Zhou Peiyuan (China, 2021)**: Recognized for excellence in mechanics.
- **Top 5 in China, iCAN Innovation Contest (2021)**: Ranked 5th out of 3000 teams nationally (Group Award).

Mathematics:

- First Prize, National Mathematics Competition for College Students (Top 8%), 2020
- First Prize, Mathematical Modeling Competition in Liaoning Province, 2021
- Second Prize, Mathematical Modeling Competition in Liaoning Province, 2020

- Second Prize, National Mathematics Competition for College Students, 2021
- Third Prize, China CUMCM (Contemporary Undergraduate Mathematical Contest in Modeling), 2021
- Third Prize, MathorCup Undergraduate Mathematical Modeling Challenge, 2021
- Second Prize, Asia Pacific Mathematical Contest in Modeling, 2020
- Second Prize, Mathematical Contest in Modeling of Three Provinces in Northeast China, 2020

Physics:

- Third Prize, Mechanics Competition in Honour of Zhou Peiyuan, 2021
- First Prize, Physics Experiment Competition in Liaoning Province, 2020

Innovation and Design:

- iCAN Innovation Contest (Finalist), Top 5 in China, 2021
- Third Prize, China College Students' "Internet+" Innovation and Entrepreneurship Competition, 2021
- Second Prize, The 6th China International "Internet+" College Student Innovation and Entrepreneurship Competition SAU Selection, 2020
- First Prize, SAU Future Engine Design Competition

TECHNICAL SKILLS

- **Programming:** C++, Python, MATLAB, html
- **Software:** ANSYS CFX, COMSOL Multiphysics, OpenFOAM, SolidWorks
- **Tools:** Git, LaTeX, Microsoft Office

VOLUNTEERING & TEACHING

Core Team Member *May 2022 - Dec. 2022*
SIU-SAU University Collaboration Program Student Helper

- Counseled students from Shenyang Aerospace University in the SIU-SAU Collaboration program.
- Negotiated with SIU's Center for International Education for course arrangements.
- Provided emotional, mental, and financial support in collaboration with professional counselors.

Student Teacher *Dec. 2019 - Dec. 2021*
Shenyang Aerospace University

- Tutored Calculus I & II and College Physics I, including study sessions and final exam reviews.
- Assisted 66 students, improving understanding and academic performance.
- Created final review materials, including mind maps and instructional videos to aid retention.