

# Haobo Zhao

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zhbalex.github.io

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## EDUCATION

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**Johns Hopkins University**, Baltimore, MD

*Sep. 2023 - Present*

Master in Mechanical Engineering

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: 3.81/4.0

Graduated Magna cum Laude, Dean's List: Fall 2022, Fall 2023

**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

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

## RESEARCH EXPERIENCE

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- **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

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### **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

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### **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).

## TECHNICAL SKILLS

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

## **VOLUNTEERING & TEACHING**

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### **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.