Zihao Xu

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EDUCATION

Aug 2020 – Present **Purdue University** **School of Mechanical Engineering**

- Major: Mechanical Engineering Non-Thesis Master
- Cumulative GPA: 3.96/4
- Selected Courses: Artificial Intelligence, Autonomous Systems, Theory and Design of Control Systems, Data Analytics for Engineers, Deep Learning, Digital Image Processing, Adaptive Control, Modern Automatic Control

Aug 2019 – May 2020 **Purdue University** **School of Mechanical Engineering**

- Major: Mechanical Engineering Exchange undergraduate student
- Cumulative GPA: 3.91/4
- Selected Courses: Mechanical Vibration, Numerical Methods in Mechanical Engineering, Microprocessor and Electromechanical Systems, Linear Algebra, Engineering Design

Sep 2016 – Jun 2020 **Shanghai Jiao Tong University** **School of Mechanical Engineering**

- Major: Mechanical Engineering Undergraduate student
- Cumulative GPA: 3.521/4
- Selected Courses: Principles and Practice Using C++, Theoretical Mechanics, Design and Practice of Mechatronic Systems, Robotics, Modeling Analysis and System Control

RESEARCH EXPERIENCE

Jul 2021 – Present **UAV Obstacle Avoidance and Collaboration with Autonomous Boats**

Graduate research program of Mechanical Engineering at Purdue University

Advisor: **Prof. Nina Mahmoudian**, Associate Professor of Mechanical Engineering at Purdue University

- To implement a vision-based obstacle avoidance algorithm for a quadcopter in forests.
- To develop collaborative work with autonomous boats such as guiding the boats when necessary.
- Set up the **ROS** simulation environment including UAV model and basic movement controller.
- Tested several collision avoidance algorithms in different **Gazebo** worlds.

Aug 2021 – Present **Geometric Optimization in Computer Aided Design**

Graduate research program of Mechanical Engineering at Purdue University

Advisor: **Prof. Karthik Ramani**, Distinguished Professor of Mechanical Engineering at Purdue University

Dr. Min Liu, Lecturer of Mechanical Engineering and Research Scientist in C Design Lab at Purdue University

- Given a fixed number of control points and an arbitrary curve from hand sketches, minimized the B-spline reconstruction error by placing the control points.
- For predicting the optimal number of control points for an arbitrary curve from hand sketches, constructed the full workflow to train a **CNN** model, from generating the spline dataset to designing and training and validation process.

Jan 2020 – May 2020 **Design of Annular Traverse System for Zucrow Lab of Purdue**

Project for capstone course of Purdue Mechanical Engineering

Advisor: **Prof. Guillermo Paniagua**, Professor of Mechanical Engineering at Purdue University

- Designed a unique and relatively cheap annular traverse system for the wind tunnel in Zucrow Lab of Purdue, which required the traverse system to have high resolutions and the ability to withstand high temperature and air pressure while preventing air leakage.
- Validated the whole system in **SolidWorks**, created the explosive view and dynamic analysis, and decided the manufacturing method or source of supply of the system.

- Won the **Best Engineering Prize** in Malott Innovation Award of Mechanical Engineering.
- The traverse system is now being brought to reality in Zucrow Lab by faculties working there.

Aug 2019 – May 2020 Hybrid Electric Vehicle Control

Undergraduate research program of Mechanical Engineering at Purdue University

Adviser: **Prof. Peter Meckl**, Assistant Head and Professor of Mechanical Engineering at Purdue University

- Debugged the **Equivalent Consumption Minimization Strategy (ECMS)** and **Partial State of Charge (PSoC)** in Simulink and proved their feasibilities by comparing with the benchmark.
- Located the abnormal vibrations in previous implementations by tracking the signals and proposed to fix the data collector at the acceleration pedal.

Jun 2019 – Aug 2019 Robust Proprioceptive Robot Impact Detection

Summer Internship in SJTU Robotics Lab

Adviser: **Prof. Jianhua Wu**, Associate Professor in Robotics Lab of SJTU

- Designed a serial of moving paths and moving speeds for an industrial 6-DOF robot arm and implemented them using **SIMULINK** to obtain torque information of every joint in different operating conditions.
- Managed to let the dynamic threshold follow the torque curve well in certain operating conditions by minimizing the area between the threshold and torque curve using **MATLAB**.
- Applied **Recursive Least Squares Estimation (RLSE)** to the detector to estimate different coefficients needed in various operating conditions online.

SERVICE

Sep 2016 - Jun 2019 School of Mechanical Engineering of SJTU Class Representative

- Conveyed various information about activities, new policies, and tests to classmates.
- Collected students' votes, opinions, and information.
- Helped classmates solve various problems, ranging from study to daily life.

Sep 2016 - Jun 2019 Student Science and Technology Innovation Association Leader of Publicity Team

- Invited professors and organized workshops for ME students.
- Conducted routine affairs and propaganda, including videos and posters, for a robot design competition.
- Instructed and coached the contestants on designing and manufacturing in the competition.
- Obtained excellent leader honor when holding the competition for new students.

SKILLS

Programming	Python, C++
Technical Tool	MATLAB, ROS, SolidWorks, CAD, Git, LaTeX, PyTorch
	Arduino, Raspberry Pi, STM32
Language	Chinese: Native, English: TOEFL 105

SELECTED HONORS

May 2020	Best Engineering Prize in Malott Innovation Award of ME in Purdue
Oct 2018	2018 Merit Student of Shanghai Jiao Tong University (3 out of 40)
Oct 2018	Nomination Award of Science and Technology Innovation Scholarship (Top 50 in SJTU)
Aug 2018	Special award in the 11th national university student social practice and science contest on energy saving and emission reduction (Top 1, National)
Oct 2017	Academic Excellent Scholarship (Third-Class) of SJTU (30%)