

# Jianhao ZHENG

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## EDUCATION

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**École polytechnique fédérale de Lausanne (EPFL), Switzerland**

*Sep. 2020 - Present*

- MSc in Robotics from 2020 Fall
- Selected courses: Model predictive control, Applied machine learning, Advanced algorithms, Computer vision, Aerial robotics, Distributed intelligent systems

**Shanghai Jiao Tong University (SJTU), Shanghai, China**

*Aug. 2016 - Jul. 2020*

- B.E. in Mechanical Engineering, School of Mechanical Engineering; GPA: 3.63/4.0
- Awarded Academic Excellent Scholarship (Second-Class) of SJTU for three consecutive years
- Main Courses: Linear Algebra(95), Modeling Analysis and System Control(91), Principles and Practice Using C++ (91), Design and Practice of Mechatronic Systems (91), Robotics (90)

**National University of Singapore (NUS), Singapore**

*Jun. 2019–Sept, 2019*

- Summer Research Intern

## PROJECTS

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**Distributed Model Predictive Control Architectures for Multi-Rotor Micro Aerial Vehicles**

Semester project, obtained grade: **5.75/6**

*Feb. 2021 - Jun. 2021*

Advisor: **Izzet Kagan Erunsal** and **Prof. Alcherio Martinoli**, Distributed Intelligent Systems and Algorithms Laboratory (DISAL), EPFL

- Conducted literature survey on multiple multiple MAVs' formation control and investigated into different types of **Distributed Model Predictive Control** (Distr-MPC) architectures.
- Theoretically formulated three most prominent Distr-MPC schemes and prototyped them in MATLAB to simulate a benchmark formation control problem. Performances regarding to the formation error, computational time and robustness to communication quality were compared.
- Implemented the best Distr-MPC architecture and a Decentralized MPC scheme in a high-fidelity framework consisting of the Webots simulator and the Robotic Operating Systems (ROS) with **ACADO Toolkit** as the MPC solver. The Distributed MPC has 37% less formation error than the Decentralized MPC. [[project](#)][[slides](#)]

**Crazyflie: Auto navigation and landing**

Course project (Aerial Robotics), obtained grade: **5.88/6**

*Apr. 2021 - Jun. 2021*

Advisor: **Prof. Dario Floreano**, Laboratory of Intelligent Systems (LIS), EPFL

- Programmed based on Crazyflie 2.1 enabling a Crazyflie to auto-navigate through a broad region and avoid obstacle with sensor readings from multi-ranger deck.
- Implemented A\* algorithm to control the Crazyflie to search an unknown landing pad with a z-range sensor in a region and designed a robust algorithm to control the drone to fly back to the take-off pad after landing. [[code](#)] [[video](#)]

## Cross-Modal Fusion between Data in SAXS and Cryo-EM

Research Assistant at National University of Singapore

*Jun. 2019 - Sep. 2019*

Advisor: **Prof. Gregory Chirikjian**, Head of Department of Mechanical Engineering at NUS

- Proposed to fuse the information from cryo-electron microscopy (**cryo EM**) and small-angle X-ray scattering (**SAXS**), in exploiting the synergies of both techniques for biomolecular structure determination.
- Simulated the SAXS-EM fusion on the data of **nucleosome-Chd1** from Protein Data Bank in **Matlab** and demonstrated an outperformance in biomolecular structure reconstruction accuracy by using the fusion of SAXS-EM, compared to EM alone.
- Contributed to the paper published in arXiv, Cross-Modal Fusion Between Data in SAXS and Cryo-EM for Biomolecular Structure Determination.

## An Inverted Pendulum Controlled by UR Robot

Design and Practice of Mechatronic Systems Final Project (top 4 students)

*Feb. 2019 - Jun. 2019*

- Designed and manufactured an inverted pendulum installed with a **potentiometer** to match the **UR5e Robot**.
- Programed through **MoveIt Motion Planning Framework** in ROS to control the movement of **UR5e Robot** according to the situation of inverted pendulum.
- Managed to keep the inverted pendulum unfallen and stable under disturbance through our controller.

## SELECTED HONORS

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Excellent Graduates of Shanghai Jiao Tong University (5%)

*Jun. 2020*

Meritorious winner in Mathematical Contest in Modeling (13%)

*Feb. 2018*

Academic Excellent Scholarship (Second-Class) of SJTU (40 out of 420)

*Oct. 2017 - Oct. 2019*

The Most Popular Award at the Spring Works Exhibition (top 5%, departmental)

*Jun. 2018*

Merit Student of Shanghai Jiao Tong University (3 out of 40)

*Oct. 2017*

## SKILLS

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**Programming**

proficient: MATLAB, Python; intermediate: C++

**Technical Tools**

Webots, ROS, Linux, Git, Latex, Arduino, Raspberry Pi, UG, SolidWorks

**Language**

Chinese (native), English (C1)