# Zhuoyuan (Joe) YU

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**Research interests:** Robotics, Deep Reinforcement Learning, Multi-Agent Systems, UAVs

## EDUCATION

**National University of Singapore** **GPA: 5.0 / 5.0** *Singapore*

Major: M.Eng. in Mechanical Engineering (By Research), *Department of Mechanical Engineering* *08/2023-Present*

- **Core Courses:** Linear Systems, Autonomous Mobile Robotics, Advanced Robotics
- Research focus: Robotics, Multi-agent Deep Reinforcement Learning, Control
- Master thesis: Multi-agent Reliable Navigation in Dynamical Environments

**Northwestern Polytechnical University** GPA: 84% *Xi'an China*

Major: B.Eng. in Aircraft Design and Engineering, *School of Aeronautics* *09/2019-07/2023*

- **Scholarship**: Second Prize Scholarship Excellent Student Leader
- **Core Courses**: Aerodynamics, Automatic Control Theory, Mathematics Analysis, Linear Algebra
- NPU School of Aeronautics Student Union | **President** *04/2021-06/2022*
- International Internet+ College Students Innovation and Entrepreneurship Competition *National Gold Award*
- "Huamo Cup" National College Students Flight Simulation Championship *National Third Prize*

## RESEARCH EXPERIENCE

- **Multi-Agent Path Finding Based on Deep Reinforcement Learning** *05/2024-Present*

  [Agency for Science, Technology and Research] | *Supervisor: Guo Hongliang*
  - Improved the existing Node2Vec algorithm to handle the dynamic topological networks better.
  - Utilized Graph Attention Networks to enhance the decision-making weights of dynamic edges.
  - Integrated reinforcement learning for online training of the network.

  *Related:* Python, Pytorch, ROS1, Multi-Agent Systems, Graph Attention Networks, Natural Language Processing

- **Design and Control of Manta Ray Robot (Bioinspired Underwater Robot)** *08/2023-Present*

  [NUS ME Control and Mechatronics Labs] | *Supervisor: Chew Chee Meng*
  - Designed a new type of buoyancy system and mass adjustment system for the Manta Ray robot.
  - Improved original single-degree-of-freedom pectoral fin to dual-degree-of-freedom, enhancing controllability.
  - Upgraded Arduino-based control system to include control of the buoyancy system and the pectoral fins.

  *Related:* Python, Arduino, SolidWorks, Bioinspired Robotics

- **Quadcopter Overall Design and Trajectory Re-planning** *07/2020-09/2021*

  [NPU Aircraft Design and Testing Technique Engineering Laboratory] | *Supervisor: Wang Ban*
  - Designed and made a quadcopter unmanned aerial vehicle (UAV).
  - Studied the trajectory re-planning and obstacle avoidance of UAVs.

  *Related:* MATLAB, XFLR5, Catia, Aerodynamics

## SELECTED PROJECTS *Project Website*

- Autonomous Mobile Robotics [GitHub] | *ROS1, Python, OpenCV* *01/2024-04/2024*
  - Navigate the robot to the designated location and specified pattern integrating vision recognition.
- Manipulator Simulation [GitHub] | *MATLAB, Kinematics* *03/2024-04/2024*
  - Establish a robotic arm model, then use inverse kinematics to calculate the corresponding joint angles.

## PUBLICATIONS (* corresponding author)

Multi-Robot Reliable Navigation in Uncertain Topological Environments with Graph Attention Network *In Submission*

***Related***: Multi-agent System, Graph Neural Networks, Deep Reinforcement Learning

## SKILLS

**Programming Language**: Python (Proficient), MATLAB (Proficient), C++ (Intermediate), Arduino (Beginner)

**Robotics Related:** ROS1 (Intermediate), Gazebo (Beginner), SolidWorks (Proficient), Catia (Intermediate)

**Others:** Latex, Tableau, Visio, Origin, Adobe Premiere Pro, SPSS, Photography