


# CHENG-HAN (Michael) YU

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Portfolio : <https://michaelyuuu.github.io/website-Michael-yu/>

## EDUCATION

### University of California, San Diego (UCSD)

La Jolla, CA

M.S. in Mechanical and Aerospace Engineering

Sep. 2025 – Mar.2027(Est.)

**Relevant Coursework** : Robotics, Sensing & Estimation in Robotics, Planning & Learning in Robotics

### National Tsing Hua University (NTHU)

Hsinchu, Taiwan

B.S. in Power Mechanical Engineering

Sep. 2020 – Jun. 2024

## SKILLS

**Core Competencies:** Mechatronics | Robotics | CAD | Mechanical Design | Prototyping | Servo Control | Sensor Integration

**Software & Tools:** MATLAB/Simulink | SolidWorks | Python | ROS | C/C++ | AutoCAD | ANSYS | ADAMS | COMSOL

## RESEARCH EXPERIENCE

### Humanoid Robots for Medicine – dVRK Tool Integration

La Jolla, CA

Graduate Student Researcher @ Advanced Robotics and Controls Lab (Prof. Michael Yip)

Oct. 2025 – Present

- Designed and implemented a mechatronic actuator interface module enabling a Unitree humanoid robot to **integrate dVRK surgical components**, supporting precise **servo-level control** for automated medical manipulation.
- Developed low-level servo command mapping between humanoid joint actuators and multi-DOF surgical end-effectors, addressing kinematic coupling, calibration, and repeatability constraints.
- Prototyped mechanical components using **3D printing**, achieving fast validation of mechanical fit and actuator placement.

## PROFESSIONAL EXPERIENCE

### NTHU Racing (Formula Student Team @ NTHU)

Sep. 2020 – Aug. 2023

Leader of Suspension / Suspension Engineer

- Designed and manufactured the double-wishbone suspension and anti-roll bar systems for electric racecar in SolidWorks, **tuning ride compliance, damping behavior, and roll stiffness** to balance handling performance with driver comfort.
- Implemented a yaw-tracking torque-vectoring algorithm in C/C++, integrating tire models, IMU, steering sensors, and ground-speed sensors in **MATLAB/Simulink**, improving cornering performance and drivability by 10%.
- Conducted **multibody simulations** in MSC ADAMS to analyze heave/pitch/roll modal behavior, suspension compliance, and steering feedback, enhancing driver confidence and subjective ride feel.
- Applied **verification & validation (V&V)** methods by correlating full-car simulation(Carsim) results with test-rig measurements and real-time telemetry to ensure model accuracy and guide final suspension and torque-vectoring setup, contributing to P4 in acceleration and P5 in skidpad at Formula Student Czech 2023.

### NTHU Racing (Formula Student Team @ NTHU)

Sep. 2023 – Aug. 2024

Team Leader

- Led and managed an 80+ member race team across eight technical departments, ensuring **vehicle system integration**.
- Managed complex project timelines and secured necessary sponsorship to successfully **develop an autonomous 4-wheel-drive FS electric racecar**, achieving first place in the Formula Student Taiwan 2024

## SELECTED PROJECT

### IMU Orientation Tracking and Panorama Reconstruction, Sensing & Estimation in Robotics, UCSD

Feb 2026

- Developed a quaternion-based IMU orientation estimation with **sensor integration**, using projected gradient descent, fusing gyroscope motion and accelerometer observations to reduce drift and achieve >80% roll/pitch error reduction.

### Automated Tower of Hanoi Solver for a Robotic Arm (First-Place award), for Robotics, NTHU

June 2024

- Developed and integrated an **inverse kinematics (IK) solver** with MoveIt! in ROS using **Python** to control a 4-axis robotic arm, enabling precise trajectory planning.
- Utilized **RViz** for real-time **trajectory visualization** and obstacle-free verification, accelerating system testing and debugging.
- Optimized the autonomous Tower of Hanoi solution through **trajectory planning** algorithms, resulting in a 50% performance improvement and securing First Place in the final project competition.