

# CHENG-HAN (Michael) YU

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

## EDUCATION

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<b>University of California, San Diego (UCSD)</b>	<b>La Jolla, CA</b>
<i>M.S. in Mechanical and Aerospace Engineering</i>	<i>Sep. 2025 – Mar. 2027(Est.)</i>
<b>Relevant Coursework :</b> Robotics, Sensing & Estimation in Robotics, Planning & Learning in Robotics	
<b>National Tsing Hua University (NTHU)</b>	<b>Hsinchu, Taiwan</b>
<i>B.S. in Power Mechanical Engineering</i>	<i>Sep. 2020 – Jun. 2024</i>

## SKILLS

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**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

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<b>Humanoid Robots for Medicine – dVRK Tool Integration</b>	<b>La Jolla, CA</b>
Graduate Student Researcher @ Advanced Robotics and Controls Lab (Prof. Michael Yip)	<i>Oct. 2025 – Present</i>
<ul style="list-style-type: none"><li>Designed and implemented a mechatronic actuator interface module enabling a Unitree humanoid robot to <b>integrate dVRK surgical components</b>, supporting precise <b>servo-level control</b> for automated medical manipulation.</li><li>Developed low-level servo command mapping between humanoid joint actuators and multi-DOF surgical end-effectors, addressing kinematic coupling, calibration, and repeatability constraints.</li><li>Prototyped mechanical components using <b>3D printing</b>, achieving fast validation of mechanical fit and actuator placement.</li></ul>	

## PROFESSIONAL EXPERIENCE

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<b>NTHU Racing</b> (Formula Student Team @ NTHU)	<i>Sep. 2020 – Aug. 2023</i>
Leader of Suspension / Suspension Engineer	
<ul style="list-style-type: none"><li>Designed and manufactured the double-wishbone suspension and anti-roll bar systems for electric racecar in SolidWorks, <b>tuning ride compliance, damping behavior, and roll stiffness</b> to balance handling performance with driver comfort.</li><li>Implemented a yaw-tracking torque-vectoring algorithm in C/C++, integrating tire models, IMU, steering sensors, and ground-speed sensors in <b>MATLAB/Simulink</b>, improving cornering performance and drivability by 10%.</li><li>Conducted <b>multibody simulations</b> in MSC ADAMS to analyze heave/pitch/roll modal behavior, suspension compliance, and steering feedback, enhancing driver confidence and subjective ride feel.</li><li>Applied <b>verification &amp; validation (V&amp;V)</b> 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.</li></ul>	
<b>NTHU Racing</b> (Formula Student Team @ NTHU)	<i>Sep. 2023 – Aug. 2024</i>
Team Leader	
<ul style="list-style-type: none"><li>Led and managed an 80+ member race team across eight technical departments, ensuring <b>vehicle system integration</b>.</li><li>Managed complex project timelines and secured necessary sponsorship to successfully <b>develop an autonomous 4-wheel-drive FS electric racecar</b>, achieving first place in the Formula Student Taiwan 2024</li></ul>	

## SELECTED PROJECT

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<b>IMU Orientation Tracking and Panorama Reconstruction, Sensing &amp; Estimation in Robotics</b> , UCSD	<i>Feb 2026</i>
<ul style="list-style-type: none"><li>Developed a quaternion-based IMU orientation estimation with <b>sensor integration</b>, using projected gradient descent, fusing gyroscope motion and accelerometer observations to reduce drift and achieve &gt;80% roll/pitch error reduction.</li></ul>	
<b>Automated Tower of Hanoi Solver for a Robotic Arm (First-Place award)</b> , for <i>Robotics</i> , NTHU	<i>June 2024</i>
<ul style="list-style-type: none"><li>Developed and integrated an <b>inverse kinematics (IK) solver</b> with <b>MoveIt!</b> in <b>ROS</b> using <b>Python</b> to control a 4-axis robotic arm, enabling precise trajectory planning.</li><li>Utilized <b>RViz</b> for real-time <b>trajectory visualization</b> and obstacle-free verification, accelerating system testing and debugging.</li><li>Optimized the autonomous Tower of Hanoi solution through <b>trajectory planning</b> algorithms, resulting in a 50% performance improvement and securing First Place in the final project competition.</li></ul>	