

CHENG-HAN (Michael) YU

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EDUCATION

University of California, San Diego (UCSD)

San Diego, US

M.S. in Mechanical and Aerospace Engineering

Sep. 2025 – Present

National Tsing Hua University (NTHU)

Hsinchu, Taiwan

B.S. in Power Mechanical Engineering

Sep. 2020 – Jun. 2024

SKILLS

Core Competencies: Robotics | Mechatronics | Mechanical Design | Vehicle Dynamics | Prototyping | GD&T | FEA | CAD |

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

PROFESSIONAL EXPERIENCE

NTHU Racing (Formula Student Team @ NTHU)

Sep. 2020 – Aug. 2023

Leader of Suspension / Suspension Engineer

- Designed and manufactured double-wishbone suspension system with anti-roll bar systems using **SolidWorks**; performed **FEA** to optimize weight-to-stiffness ratio, reducing 20% system weight.
- Performed **multibody system modeling** for suspension kinematics analysis in **ADAMS**, improving global suspension system stiffness by 10% through component-level weight-to-stiffness optimization.
- Implemented torque-vectoring algorithm in **C/C++** for 4WD electric racecar, integrated tire model, IMU, steering sensor and ground-speed sensor in **MATLAB/Simulink**, improving cornering performance by 10%.
- Leveraged **fast prototyping** to rapidly develop components for **sensor integration** and track data acquisition.
- Integrated real-time telemetry with driver feedback during rigorous track testing to fine-tune suspension and torque vectoring setups, securing 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**.
- Engineered Taiwan's first custom 10-inch carbon-fiber wheel rims and carbon-fiber monocoque chassis.
- 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

Robotics Project - Tower of Hanoi (*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.

Motor Digital Controller Design for Digital Control, NTHU

Dec. 2023

- Programmed a motor position controller in **C** on an **STM32 microcontroller**.
- Optimized performance of PID controller through **Bode plot analysis** in discrete domain.

Self-Made Motors and PID Controller Design for Control System II, NTHU

June 2023

- Custom-built permanent magnet DC motor with self-wiring and integrated sensor system.
- Implemented a **push-pull amplifier speed controller** with PID feedback.

PUBLICATIONS

Cheng-Han Yu, Zhi-Qiang Lee, Meng-Hsuan Tien, and Ming-Huang Li. "Nonlinearity Modification of CMOS-MEMS Resonators with Stress Concentration Structures", International Conference on Smart Sensors, July 1-3, 2024

- Conducted **electromechanical system modeling** (using **COMSOL**, **ANSYS**, and **MATLAB**) to perform CMOS-MEMS **nonlinear vibration analysis**.
- Improved device power handling capability by designing a novel stress concentration structure that mitigated electrical actuation nonlinearity.