Yao-Peng Chang

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EDUCATION

National Taiwan University (NTU), Taipei, Taiwan 09/2021 - 01/2026

B.S. in Mechanical Engineering, minor in Computer Science and Information Engineering

Overall GPA: 4.14/4.3 | Ranking: 7/210 (3%)

PUBLICATIONS

- Chang, P.-Y.*, Chou, C.-H.*, **Chang, Y.-P.***, Lin, P.-C.
  "Development of a Dual-Mode Spherical Robot Using a Differential Drive," *Under review*, IEEE Robotics and Automation Letters (RAL), 2025. * Co-first authors
- Chang, P.-Y.*, Chou, C.-H.*, Wang T.-J*., **Chang, Y.-P.***, Lin, P.-C.
  "A Two-Degree-of-Freedom Pendulum-Driven Spherical Robot Platform," 2025 International Conference on Advanced Robotics and Intelligent Systems (ARIS) & 2024 National Conference on Advanced Robotics (NCAR), Oral Presentation, 2025. * Co-first authors

RESEARCH EXPERIENCE

Bio-inspired Robotics Laboratory | *Undergraduate Researcher* 06/2023 - 10/2025

"Development of a Dual-Mode Spherical Robot Using a Differential Drive," advisor: Prof. Pei-Chun Li

- Designed a spherical robot with differential-like mechanism to achieve omnidirectional rolling and built dynamic models in MATLAB/Simulink validated through experiments
- Developed 2 control methods: Angular velocity control reduced IAE by 87.1% compared to open-loop control; impulsive momentum control shortened escape time on deformable terrain by a factor of 7.4 and nearly doubled the success rate compared to angular velocity control in the experiments

WORK EXPERIENCE

Logitech | *Mechanical Engineering Intern, Racing Simulation Products* 07/2024 - 08/2024

- Built the company's first active-pedal prototype, benchmarking existing commercial systems to identify required force-feedback performance and user-response characteristics
- Designed and implemented a force-sensing mechanism with load cells and integrated a PID controller on linear actuators for adjustable pedal resistance with validated force profiles

PROJECT EXPERIENCE

Hub Motor Gearbox Development (3 generations) 08/2022 - present

Engineering Project, NTU Racing Formula SAE, NTU

- 2023: Developed the team's first hub planetary reduction gearbox from scratch; completed gear modeling, load analysis, bearing selection, GD&T, and ANSYS/KISSsoft strength verification
- 2024: Identified incorrect prior load-case assumptions and rebuilt boundary conditions, enabling a redesigned gearbox achieving 41% mass reduction with verified structural integrity
- 2025: Co-developed a new gearbox architecture with a junior teammate, reducing 350 g per wheel (≈ 1.4 kg per car) and 30% thickness while maintaining SF = 1.45 under peak torque
- Documented workflow and trained junior members to establish a sustainable drivetrain design pipeline; validated performance through ongoing real-vehicle testing

Traction Control & Torque Vectoring

Course Project, Vehicle Dynamics and Control, NTU

- Modeled Magic-Formula tire characteristics and built a 3-DOF bicycle vehicle model in Simulink
- Implemented PID slip control and differential torque vectoring, enhancing cornering stability and improving acceleration by 0.35 second

Handsome Yoga – Real-Time AI Pose Guidance System

Course Project, Robot Vision, NTU

- Built a real-time yoga feedback system with webcam, integrating MediaPipe 3D pose landmarks, MLP pose classification, and IQR-based joint-angle evaluation

Autonomous Wafer Handling Robot

Course Project, Electromechanical System Principles and Experiments (I), NTU

- Designed wafer lifting mechanism that minimizes acceleration for smooth and stable placement
- Developed myRIO controller to perform IR obstacle detection and webcam-based angle estimation for autonomous pickup/placement

Texas Hold'em AI Agent – Rainbow DQN

Course Project, Foundation of Artificial Intelligence, NTU

- Implemented MCCFR, Deep CFR, DQN, and Rainbow DQN with PyTorch self-play.
- Applied prioritized replay, distributional learning, and dueling networks to achieve the strongest win rate and stable convergence in Rainbow DQN algorithms

Backflipping Mechanical Cat Robot

Hackathon Project, 2023 MakeNTU Hackathon, Taipei

- Designed a spring-powered energy storing mechanism and a cam to trigger rapid energy release for controlled backflips

AWARDS

- Presidential Award, Academic Year 2022 – Top 2% of department students
- Academic Excellence Award (3 semesters) – Top 5% of class each semester
- First Prize, 2024 MechaHeroes Competition – 2-DOF spherical robot research & design
- FSAE Japan 2025 – Overall 11/25 (EV Class) – Completed in Formula Student competition
- FSAE Japan 2025 – Sportsmanship Award & JAMA Chairman Award – Recognized for outstanding team performance and professionalism
- Best Popularity Award, 2023 MakeNTU Hackathon

EXTRACURRICULAR

NTU ME International Compass 01/2025 - present

- Interviewed alumni studying abroad and published articles, improving graduate-school information access for all NTU ME students
- Built the web platform and database to organize graduate school information
- Led a mentor program that connected overseas alumni with prospective graduate-school applicants, resulting in over 10 successful matches

SKILLS

- **CAD** | SolidWorks, Creo, AutoCAD, Inventor, Fusion
- **Programming Languages** | C/C++, Python, LabView, MATLAB
- **Analysis** | MATLAB, ANSYS, COMSOL, KISSsoft, Webots