Max Chen

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Professional Summary

Dedicated Robotics Engineer with a passion for innovation in robotics, embedded systems, and AI. Expertise in computer vision, machine learning, hardware design, and fabrication. Experienced in developing AI-powered PPE detection systems, educational robotics kits, and advanced instrumentation systems. Interests focus on the intersection of robotics and human interaction, with openness to diverse fields including audio engineering.

Education

Purdue University, West Lafayette, IN — Aug 2021 – May 2025

- **Degree:** Bachelor of Science in Robotics Engineering Technology
- **Minor:** Electrical Engineering Technology
- **Honors:** Dean's List & Semester Honors (2022-2025)

Experience

Audio Engineering Research Assistant, SEAT Lab, Purdue University – West Lafayette, IN — Aug 2024 – Present

- Conducting advanced audio research focusing on the relationship between acoustical loads and electrical impedance
- Designed and implemented custom Python scripts for semi-automated data collection, improving measurement process efficiency
- Use advanced instrumentation tools for precise data acquisition, signal processing, and frequency response analysis
- Maintain detailed research documentation and contribute to academic publications

Teaching Assistant / Laboratory Instructor, Purdue University – West Lafayette, IN — Aug 2024 – Dec 2024

- Facilitated hands-on laboratory sessions for 25+ students in ECET 327 (Instrumentation and Data Acquisition Design)
- Taught and provided support in NI LabVIEW programming
- Provided detailed feedback on lab reports and assignments, ensuring mastery of course exercises
- Troubleshot complex hardware and software issues

Engineering Intern, Purdue Applied Research Institute – Crane, IN — May 2024 – Aug 2024

- Performed cutting-edge research on silicon wafer manufacturing processes and direct bonding techniques
- Assembled and optimized a precision wafer probe station from diverse components
- Designed and fabricated controller hardware/software to integrate linear positioning systems
- Created control schemes using gestures through computer vision technology

Robotics Research Assistant, HIRoLab, Purdue University – West Lafayette, IN — Sept 2022 – Feb 2025

- Developed I2C communication protocols between single-board computers and microcontrollers using ROS
- Designed, fabricated, and delivered 100+ STEM-education robotic kits using advanced digital fabrication
- Assisted in testing EMG muscle sensor systems for safe human-robot interaction in educational settings
- Created comprehensive standards-based lesson plans and 2-week robotics curriculum for K-12 students
- Designed and manufactured lower leg prosthesis adapters for biomechanics research

Publications

Using Speakers as Sensors: Detecting Acoustic Loads with Dense Neural Networks and Impedance Features 2025

Max Chen, Noori Kim, Keisuke Alexander Nakamura

Extended Abstract • 10.5703/1288284317876

Nuplator: A Comprehensive Robotic Arm System for K-12 Education 2025

Andres Torres, Ahmed Soliman, [7 other authors], ***Max Chen***, et al.

10.1007/s41686-025-00102-9

Projects

PPE A.I. Vending Machine Senior Capstone Project

- Intelligent vending machine system utilizing AI camera technology to detect PPE compliance
- Automatically dispenses missing Personal Protective Equipment to workers
- Real-time PPE detection using YOLO object detection algorithm with custom trained model
- User-friendly GUI built with PySide6 and Nvidia Jetson Orin Nano for edge AI processing
- Tools Used: Python, PySide6, OpenCV, YOLO, Nvidia Jetson Orin Nano, Hardware Integration
- Project Website: ckyb63.github.io/capstone_T54_gui

Educational Robotics - Nuplator Research Project

- Designed and fabricated over 100 STEM-education robotic kits for K-12 students
- Developed comprehensive standards-based curriculum for 2-week robotics programs
- Created custom PCB design for educational microcontroller boards
- Implemented EMG circuit to control robot arm based on Microchip platform
- Tools Used: ROS, Arduino, Laser Cutting, PCB Design, Curriculum Development

Autonomous Rally Car Race Course Project - MFET 442

- Developed autonomous navigation system for rally car with 48-second lap time achievement around the first floor of Knoy Hall
- Implemented wall-following algorithm using LIDAR distance measurements and PD control
- Developed waypoint navigation system with AMCL localization and Hector mapping
- Integrated IMU and LIDAR sensor readings for robust autonomous navigation
- Tools Used: ROS, SLAM, Path Planning, LIDAR, AMCL, PD Control, Sensor Fusion

Leadership & Service

Instrumentation Team Lead, Human Exploration Rover Club, Purdue University Sep 2023 – Jan 2024

- Led rapid prototyping of compliant end-effectors to accelerate sample collection process
- Designed mounting hardware under geometrical and weight constraints of mobile rover

Instrumentation Team Member, Human Exploration Rover Club, Purdue University Sep 2022 – Sep 2023

- Contributed to rapid prototyping of compliant end-effectors for sample collection systems
- Assisted in designing mounting hardware within rover geometric and weight constraints

Electrical Team Member, Purdue Robomasters – West Lafayette, IN Sep 2022 – Sep 2023

- Designed and manufactured custom PCBs for control of semi-autonomous mobile robots
- Applied EasyEDA and KiCAD for circuit design and board layout

Group Leader, Purdue Space Day, Purdue University Oct 2023

- Part of a team of 5 volunteers leading and managing a group of elementary students during the Purdue Space Day event
- Ensured safe navigation and engagement of young students in hands-on STEM demonstrations and activities

around the Purdue campus

Mission Control Crew, Purdue Space Day, Purdue University Oct 2022

- Managed attendee check-in and provided directions to attendee parents
- Coordinated general operations support throughout the various activities around the campus

Technical Skills

Programming Languages: Python, C, MATLAB, Java, LabVIEW, PLC

CAD Software: SolidWorks, Siemens NX, Autodesk Inventor, Fusion 360, TinkerCAD

Robotics & AI: ROS, OpenCV, YOLO, Computer Vision, Machine Learning

Digital Fabrication: 3D Printing, Laser Cutting, Soldering, KiCad, NI Multisim

Embedded Systems: Arduino, Microbit, Raspberry Pi, Nvidia Jetson