Conor Wood Hayes

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Education

Northwestern University – *M.S. Robotics — Perception, Manipulation, and Embodied AI*	Sep 2025–Dec 2026 (expected)
University of Southern California – *B.S. Computer Engineering & Computer Science*	2015–2019

Magna Cum Laude. Minor in Chinese for the Professions, Thematic Option (Honors in Liberal Arts)

Skills

Programming Languages: Python (NumPy, Pandas, PyTorch), C++, C, CMake, Bash/Zsh, Rust, SQL, TypeScript, Verilog, Assembly
Hardware: PCB Design, Electronics, Microcontrollers, CAD (OnShape), 3D Printing, Laser Cutting
Software: ROS 2, Linux, Git, Docker, AWS, API Design, Cloud Architecture
Machine Learning & AI: Deep Learning, Imitation Learning, Foundation Models (LLM/VLM/VLA), Reinforcement Learning
Robotics: SLAM, Computer Vision, Tactile Sensing, State Estimation, Robot Kinematics & Dynamics, Path Planning, Control Theory

Projects

PolyUMI — Visual-Tactile Data Collector for Dextrous Manipulation Imitation Learning — Jan-Mar 2026
- Designed & built wireless handheld grasping data collector (based on UMI) with novel sensor array including visual touch sensor.
- Developed data extraction, cleaning, & visualization pipeline (Python, ROS 2) to support training a visual-tactile diffusion policy.
- Created motion mimicry demo for Franka Panda 7DoF arm that replays PolyUMI trajectories as derived from ORB-SLAM.

LeHome Challenge 2026 - VLA for Bimanual Garment Folding — Jan-Mar 2026
- Trained 2 SO-101 arms to fold laundry using VLA (LeRobot SmolVLA) fine-tuned on teleoperation data in Isaac Sim.
- Generated diverse synthetic training data with domain randomization + data augmentation (NVIDIA Cosmos, Python).

Simultaneous Localization and Mapping (SLAM) from Scratch — Jan-Mar 2026
- Developed & deployed from-scratch Extended Kalman Filter (EKF) LiDAR SLAM pipeline for Turtlebot3 (ROS2, C++).
- Implemented custom RViz-based simulation environment to test diff-drive control, odometry, and lidar algorithms.

PenPal — Handwriting with the Franka Panda 7DoF Robot Arm — Nov-Dec 2025
- Designed system architecture, led group of 4 to create a robot arm-based handwriting system for a randomly moving whiteboard.
- Developed online, reactive trajectory generation and closed-loop visual cartesian control (Python, ROS 2, MoveIt 2, RealSense).
- Integrated VLM (gemini-2.0-flash) to create real-time conversational loop (user writes question, arm writes response, repeat).

Traveler IV — First 100% undergrad-made rocket to fly to space *(USC Rocket Propulsion Lab)* — 2018-2019
- Built & led 30-person avionics team overseeing all software & electronics to manufacture and fly high-performance rockets.
- Developed flight software (C++), PCB's (Altium), EGSE (Python, ham radio), and data analysis (Matlab) for custom avionics system.
- Debugged electrical, software, and radio issues in the field under timing constraints, inclement weather, and poor infrastructure.

Work Experience

Conor Hayes Software Consulting (CHSC) | *Independent Consultant* — 2023 - 2025, IN/NY/CA
- Built reusable hardware testing framework (Python) for two $500K nuclear fusion test racks, driving on-time delivery in 8mos.
- Redesigned BLE protocol (C, TypeScript) for NRF52-based wearable. +2 sensors, +800% bandwidth, -10% power consumption.
- Prototyped a low-latency peer-to-peer telepresence platform for controlling robots via web client (WebRTC, AWS, TypeScript).

Wesper, Inc | *Software Engineer (8th employee @ startup)* — 2020 - 2022, New York City
- Developed sleep apnea diagnosis wearable from prototype to FDA cleared mass product as lead firmware developer (C, NRF5X).
- Added new sensors, on-device algorithms, and BLE services to enable real-time reporting of heart rate, SpO2, and sleep pose.
- Led a team of 3 to build backend from scratch (AWS ECS, EC2, λ, S3, RDS MySQL, Python) to ingest and process all patient data.

Honeybee Robotics | *Software & Electrical Engineering Intern* — May - Aug 2018, Pasadena, CA
- Developed drivers, middleware (C++, ZeroMQ), and GUIs (Qt), for ROS-based testing framework for space exploration robotics.
- Designed, assembled, and validated PCB (Altium) to provide human-in-the-loop control of small drills on remote oil rigs.

NASA Jet Propulsion Laboratory | *Flight Electronics Intern (Group 349E) - Sphinx Project* — Jan - Aug 2017, Pasadena, CA
- Developed still-in-use automated test system & BSP modules (C, Python, assembly) for first deep-space cubesat avionics system.
- Supported initial board bring-up, discovered critical bugs in novel rad-hardened NAND flash controller & other peripherals.

Awards + Hobbies

American Institute of Astronautics and Aeronautics	*Achievement Award*	Oct 2019
National Academy of Engineering/USC	*Grand Challenges Scholar*	May 2019
University of Southern California	*Renaissance Scholar (0.9% of graduating class)*	May 2019

Recorded Music: Accumulated 700,000+ Spotify streams on original music under artist name *Wise John* (24 songs, 1 album, 1 EP).