Alexander Roller

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Skills

Robotics: ROS2, NAV2, Nvidia Isaac ROS, SLAM
Electronics: KiCAD, PCB Design, DMM, Oscilloscope, Electronic Load
Microcontrollers: AVR, ESP32, Arduino, Raspberry Pi, I2C, SPI
Programming: Python, C/C++, Assembly
CAD: Autodesk Fusion 360, Onshape
Prototyping: 3D printing, CNC machining, Laser cutting, PCBA
Misc: Private Pilot License, Advanced Open Water Scuba Diver

Experience

Robotics Intern, Hampton Lumber Mills – Willamina, OR — Summers 2024/2025

- Converted "Sweepy" into a fully autonomous robot by integrating LiDAR SLAM + NAV2 on Jetson Nano/ESP32, writing a custom brush-control ROS package, and redesigning the battery for longer runtime at lower weight.
- Built "Sucky," a custom vacuum chassis using a Realsense D455 with VSLAM + nvblox for 3D avoidance and ROS2 packages for cyclone impellers, rotary airlock, dust chamber door, and shaker motor.
- Developed a lawnmower-style path planner and mission controller that transformed rectangular work envelopes into repeatable coverage routes between autonomous waypoints.

Undergraduate Robotics Researcher, Do Robotics Lab – Corvallis, OR — September 2025 – Present

- Advancing Stanford's Bi-Stable tape manipulator project by characterizing its reconfigurability, adjustable stiffness ranges, and low-profile packaging for deployable robots.
- Investigating how state transitions affect stiffness adjustments to unlock repeatable reshaping on-demand.
- Sharing findings with the Do Robotics team to steer upcoming manipulator prototypes and control studies.

President/Founder, Humanoid and Intelligent Robotics Club – Corvallis, OR — 2025

- Launched HIRO to deploy Nvidia VLA/VLM models on an SO101 arm + Jetson Thor that autonomously plays tic-tac-toe against attendees at outreach events.
- Leading the design of cost-effective, custom actuators and drivetrain modules that will scale to a full humanoid research platform.
- Organizing member teams across perception, manipulation, and embedded systems to deliver demos and grow the club's footprint.

Projects

High Voltage ESC for an Electrostatic Strain Wave Motor — Senior Capstone

- Designed a high-voltage PCB with three digitally controllable phases plus isolated gate-drive, sensing, and firmware hooks to command a novel electrostatic strain wave motor prototype.

heartToHeart — https://github.com/AlexanderRoller/heartToHeart

- Built an IoT "telepathy" lamp/display that mirrors heart rate data via AWS IoT, an ESP32, and a custom iOS app with synchronized lighting animations.

Automated Stock Market Assistant — https://github.com/AlexanderRoller/BurryDeez

- Created a Discord bot for a 450-member investment group to stream live market data, automate valuation math, and alert watchlists without spreadsheets.

Education

Oregon State University – BS in Electrical and Computer Engineering (Minor in CS) — June 2026
Oregon State University – MS in Robotics — June 2027