

# David Alex

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## EDUCATION

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**Worcester Polytechnic Institute** | Worcester, MA

**May 2025**

*Bachelor of Science in Robotics Engineering*

- Relevant Coursework: Industrial Robotics, Robotic Navigation, Robotic Manipulation, Embedded Computing in Engineering Design, Control Engineering, Mechanical Applications in Robotics, Sensing and Perception in Robotics
- Research: YOLO Vision, Voice Commands, & End Effector Manipulation on a 3D-Printed Humanoid Robot advised by Pradeep Radhakrishnan and Taylor Andrews
- Club: Captain of the WPI Valorant E-sports Team

## PROJECTS

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### **End Effector Manipulation on a 3D-Printed Humanoid Robot:**

*Simulation Researcher*

**September 2024 – May 2025**

- Simulated the humanoid robot using CoppeliaSim, by testing trajectory planning, inverse kinematics, and library implementations
- Implemented the IKPY python library to compute inverse and forward kinematics, which uses a URDF to describe the robot's geometries and joint positions
- Utilized object detection, face meshing, and OpenAI speech recognition to construct human-robot interaction
- Conducted contactless temperature checks using an IR thermometer and Inverse Kinematics

### **Mobile Robot for Autonomous SLAM-Based Navigation:**

*Developer*

**October 2024 – December 2025**

- Developed an autonomous mobile robot capable of SLAM using LIDAR sensor data
- Implemented Monte Carlo Localization to perform accurate state estimation
- Integrated the A\* algorithm and obstacle avoidance to navigate efficiently through the map
- Designed and tested frontier-based exploration algorithms to enable the robot to discover and map uncharted areas
- Utilized ROS to simulate and visualize with Gazebo and RViz and on a real map

### **Industrial Robotics Coursework:**

*Developer*

**March 2025 – May 2025**

- Operated a UR5e collaborative robot using the teach pendant to program and execute motion paths, perform pick-and-place tasks, and test workspace limits
- Developed and simulated robotic work cells using ABB IRB 1600 (serial) and IRB 360 FlexPicker (parallel) robots for a case packing and palletizing system
- Implemented object detection, smart components, conveyor logic, and coordinate frames to simulate dynamic object handling and multi-robot collaboration.
- Optimized pick-and-place operations for real-world manufacturing environment and motion programming (RAPID) to achieve precision manipulation and synchronization

## TECHNICAL SKILLS

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**Languages:** Python, MATLAB, RAPID, C, C++, Java, Racket

**Tools:** UR5E Industrial Robot, ROS, ROS2, Linux, CoppeliaSim, RobotStudio, SolidWorks, GitHub, Fusion 360, VSCode