ALEXANDER BOZARTH

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EDUCATION

Virginia Tech (Blacksburg, VA) **Expected Graduation: May 2028**

Bachelor of Science Degree (B.S.) in Mechanical Engineering (GPA: 3.74/4.00; **Dean's List:** 2024 - Present)

INDUSTRY EXPERIENCE

Counter-UAS Red Team Engineer Intern, MAAP **Aug 2026 – Present**

- Design and fabricate adversarial **drone systems** to emulate hostile UAS threats, supporting live testing and validation of **counter-drone defense systems** and sensor networks under a **federal contract**.

Robotics Engineering Intern, Lockheed Martin **Jun 2026 – Aug 2026**

- Designed and deployed a fully autonomous **multi-stage FANUC work cell** that fastens, squares, solders, and switches tools in one station, solving an ergonomic issue that was costing operators unnecessary assembly time.
- Programmed adaptive failure-detection logic enabling the robot to self-correct and avoid collisions, plus a no-vision defect/error sorting capability to reduce FOD risk and catch failures early.
- Integrated machine vision, **poka-yoke** methods, and pneumatic controls to prevent defects and operator misassembly.
- Connected cell to **Apriso (MES)** for live production data; runoff testing showed a 3x production rate versus pre-automation.
- Designed the cell's tooling, fixtures, and control hardware (PLC/control box) using **Creo, FANUC software**; earned LM Academy certification in **AI/ML** and applied it to machine-learning work on the cell.

Manufacturing Engineering Intern, IMS EP **May 2025 – Aug 2025**

- Reduced prep time **(35%)** by standardizing **work instructions** and automating documentation with **Excel Macros**.
- Improved assembly efficiency **(20%)** and woodshop output **(12%)** by using **Lean Manufacturing** and **Six Sigma.**
- Designed and fabricated fixtures and sheet metal parts in **SolidWorks/CREO**; produced fabrication drawings **(GD&T)**.
- Worked with technicians and clients to apply **Hoshin** practices and **Continuous Improvement** to design solutions.
- Used **ERP** (Epicor Vantage) to coordinate suppliers, track materials, and manage jobs efficiently.

RESEARCH & DESIGN EXPERIENCE

Hypersonics Undergraduate Researcher, Northrop Grumman **Sep 2025 – Aug 2026**

- Built a defect-analysis pipeline (modeling → meshing → aerotable rendering → DoD software rendering) using Navy **HOTSHOT** software to systematically inject and evaluate manufacturing defects on a hypersonic vehicle mesh, both external surface defects and engine defects.
- Validated simulation outputs against wind tunnel test data and ran three case studies (mesh refinement, time step reduction, turbulence intensity) to improve output accuracy and reduce interpolation error. **(Received: Restricted Research Training)**

Recovery Team Lead, MachWorks **Feb 2025 – Present**

- Designing **recovery systems** for the **first collegiate supersonic UAV**, ensuring safe landing and structural integrity.
- Leading recovery team developing compact parachute and landing gear mechanisms for confined fuselage spaces.
- Integrating **carbon fiber** components to reduce weight and enhance housing durability for recovery systems.
- Developing and prototyping an ESP32-controlled parachute release system using **Fusion 360** and **rapid manufacturing techniques** for remote activation and testing.

SELF-DIRECTED PROJECTS EXPERIENCE

Functioning Bipedal Robot Prototype **Fusion 360 | Robotics | Control Systems**

- Used **Fusion 360/3D printers** and **Arduino** to design three separated segments in the leg containing a pulley mechanism to evenly distribute the load and balance itself by pushing and pulling internally to balance.

Augmented Reality Glasses **Image Processing | Software Development | User Interface**

- Created glasses that translate foreign text using a top-view reflection system, a computer vision pipeline for text detection, and modified translation software.

Teleopting Robot Arm **Robotics | 3D Printing | Servo Motor Control**

- Designed, sourced, and assembled the SO-ARM100 open-source robotic arm from raw components and 3D-printed parts; currently developing AI/vision-based pick-and-place capabilities using the LeRobot framework

LEADERSHIP AND CLUBS EXPERIENCE

Athlete/Board Member, Virginia Tech Fencing Team **Aug 2024 – Present**

- Leading a diverse team of 50+ by organizing practices, developing strategies, and fostering a cohesive, supportive environment, enhancing leadership, communication, and conflict resolution skills.
- **Awards**: **CFC National Team Champion** (2026) | **VA Cup Team Champion** (2026)| USA Fencing **Nationals** Competitor & **Junior Olympics** Qualifier (2023, 2024)

SKILLS

- **Software**: Fusion 360, SolidWorks (Sheet Metal Conversion), OnShape, Siemens NX, Teamcenter PLM, MATLAB, JMARS, MS Office, Adobe Illustrator, CREO Parametric, ERP Systems (Vantage), FEA, AutoCAD, CAD, CAM, CFD, ROS
- **Programming Languages**: Java, JavaScript, Swift, Python, HTML, C, C++
- **Hardware Skills**: Arduino, Raspberry Pi, 3D Printing, Laser Engraver, Welding, Soldering, Circuit Design, Machining

EXTRA INVOLVEMENTS

Founder, Talos **Aug 2026 – Present**

- Founded a 20-person robotics design team for Project Hive, architecting a heterogeneous multi-robot system (aerial + ground manipulation + transport) with a shared world model, centralized task executive, and modular skill-onboarding pipeline (ROS 2, Gazebo, PX4, Nav2, MoveIt 2).

Member, Service Without Borders **Aug 2025 – Present**

- Contributing to service projects in India, Nepal, and Tanzania while giving back to the local community through volunteer initiatives focused on sustainability and cultural exchange.

Mechanical Engineer, VT CRO **Aug 2026 – Present**

- Collaborating with a team to develop a fully automated 3D printing system.
- Designing a gantry-based pick-and-place mechanism for transporting plates using OnShape CAD.

Lead Mechanical Engineer, NASA L'SPACE - Mission Concept Academy **Jan 2025 – May 2025**

- Virtual NASA workforce preparation academy, completing a Preliminary Design Review for a robotic space mission.
- Led mech. design, defining mission goals, success criteria, and payload selection via a science traceability matrix.
- Collaborated with science team to make CAD models using Siemens NX, integrating payload with other subsystems.

Undergraduate Research, The Naval Engineering Education Consortium (NEEC) **Sep 2024 – Sep 2025**

- Designing bio-inspired technology utilizing echolocation to identify sound origins.
- Using Raspberry Pi/Arduino and Fusion 360 to control ear tendons for optimized sound detection.

Co-Founder and Chief Technology Officer, Odor Armor Inc. **Aug 2023 – May 2024**

- Conducted lab work to develop a solidifying solution that evaporates at room temperature to eliminate odors.
- Designed an adjustable, interchangeable vessel using Fusion 360 and 3D printers for optimal scent dispersion.
- Collaborated on a four-person school incubator team with professional mentors to develop a product and present a marketing plan to potential investors in an entrepreneur competition.

Athletic Attendant and Referee, Northbrook Park District **Sep 2021 – May 2024**

- Part-time employment providing guidance to soccer coaches and parents by ensuring games run according to schedule, setting up and taking down equipment for soccer games, and troubleshooting.

EXTRA PROJECTS

Ionic Thruster Concept **Experimental Physics | Simulation**

- Built an ionization chamber with emitters and collectors, optimizing electrode spacing for efficient ion thrust.

Automated Lawnmower **Autonomous Navigation | Embedded Systems | Circuit Design**

- Innovative automated lawnmower concept using a metal strip perimeter for precise yard mapping and tracking.

Haptic Feedback Robotic Hand **Microcontroller | 3D Printing | Sensor Integration**

- Designed glove with potentiometers for precise hand articulation, converting analog to digital signals and mapping finger movements to servo commands that drove a 3D-printed robotic hand in real time.