

# James Wade

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## EDUCATION

### BACHELOR OF MECHANICAL ENGINEERING, COMPUTER SCIENCE & MATH MINORS April 2026

Brigham Young University – Ira A. Fulton College of Engineering

**GPA:** 4.0/4.0 | Emphasis in controls and mechatronic systems

**Groups:** Mars Rover Team, Rocketry Club, Spacecraft Club, Mechatronics Club, Global Engineering Outreach

## ACADEMIC PROJECTS & EMPLOYMENT

### AUTONOMY INTERN May 2025 - present

*Sandia National Labs, AutonomyNM Division – Albuquerque, NM*

- Designed a ROS 2-based autonomy stack for multi-agent warehouse robots using SLAM toolbox, Navigation2, and ROS 2 control
- Mentored two undergraduates in verification testing and system debugging
- Selected to present research at an internal conference to Sandia technical leadership and graduate programs

### EMBEDDED SYSTEMS INTERN May 2024 – Aug 2024

*Lawrence Livermore National Laboratory (LLNL) – Livermore, CA*

- Engineered an STM32-based remote control system to command a fleet of test rafts for nuclear diagnostics ([LIDSS](#))
- Programmed FreeRTOS task management and developed a custom LVGL-based control UI
- Delivered end-to-end mechanical, electrical, and software systems as the sole developer across the project lifecycle

### ROBOTICS RESEARCH ASSISTANT – Team Lead Aug 2023 – present

*(One of Six National Finalists, NASA BIG Idea Challenge)*

*Brigham Young University, CMR Lab – Provo, UT*

- Established the lab's initial research operations for a new faculty member, with undergraduate students leading development during the first year
- Led redesign of a soft, inflatable octahedral robot for lunar deployment, including novel parent-child radio networking with error-checking protocols
- Developing algorithms to maximize workspace and ensure robust traversal under actuator failure conditions
- Managed stakeholder communications via weekly meetings and progress reports, helping secure additional funding from the Utah NASA Space Grant Consortium

### DRONE RESEARCH ASSISTANT Aug 2024 – present

*Brigham Young University, MAGICC Lab – Provo, UT*

- Investigating factor graph optimization and EKF-based controllers for multi-agent navigation in GPS-denied environments
- Simulating and validating system performance using OpenVINS, ROS 2, and empirical flight data

### COMPLIANT MECHANISMS RESEARCH ASSISTANT Jun 2023 – Aug 2023

*Mark Rober / Brigham Young University, CMR Lab – Provo, UT*

- Collaborated with Mark Rober to develop [The World's Smallest Nerf Gun](#) on five scales (72M+ views)
- Conducted 100+ design tests to identify failure modes and drive mechanical optimization through weekly technical reporting and meetings

## ***PUBLICATIONS & PRESENTATIONS***

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### **Publications**

1. Mihai Stanciu, Spencer Stowell, Isaac Weaver, Adam Rose, Chris Paul, **James Wade**, Ashleigh Cerven, Annie O'Bryan, Brian Bodily, Logan Yang, and Nathan Usevitch, "Untethered Isoperimetric Robotic Truss for Lunar Applications", *Submitted to IEEE Transactions on Robotics*, 2025.
2. Derek Sanchez, Robert Macdonald, Brendan Mitchell, **James Wade**, McKay Wilkerson, Hunter Hinnen, Marshall Rawlins, Gregory P. Nordin, Adam T. Woolley, Troy R. Munro, "Advancing the applications of 3D printed microfluidics: Utilizing quantum dots to measure internal temperature", *International Journal of Heat and Mass Transfer*, 2025.

### **Conference Proceedings and Presentations: Podium**

1. **James Wade**, Chris Paul, Mihai Stanciu, Spencer Stowell, Isaac Weaver, Adam Rose, Ashleigh Cerven, Annie O'Bryan, Brian Bodily, Logan Yang, and Nathan Usevitch, "Untethered and Modular Inflatable Robot for Lunar Applications", *Finalists in the 2024 NASA BIG Idea Challenge — Inflatable Systems for Lunar Operations. Technical paper presented at the NASA BIG Idea Symposium*, November 2024.
2. **James Wade**, Chris Paul, "Constant-Pressure Untethered Soft Robotics: An Adaptable Solution to the Limitations of Soft Robots", *Utah Conference on Undergraduate Research*, 2024. Announcement of our NASA grant.

### **Conference Proceedings and Presentations: Poster**

1. **James Wade**, Chris Paul, "Untethered and Modular Inflatable Robot for Lunar Applications", *Lunar Surface Innovation Consortium (LSIC)*, November 2024.

## ***SCHOLARSHIPS & GRANTS***

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| 2025 | <b>Utah NASA Space Grant Consortium Fellowship</b> , \$2,000 research stipend for work on multiply-redundant soft robots in space environments |
| 2024 | <b>NASA BIG Idea Competition Funding</b> , funded as one of six finalists in 2024-2025 intercollegiate competition                             |
| 2019 | <b>President Russell M. Nelson Scholar</b> , 4-year full-ride scholarship to BYU (highest scholarship available)                               |

## ***HONORS & AWARDS***

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| 2025 | <b>Dean's List (x8)</b> , top 5% of BYU Engineering department |
| 2023 | <b>Phi Kappa Phi</b> , top 7.5% of BYU Engineering juniors     |
| 2023 | <b>Tau Beta Pi</b> , top 12.5% of BYU Engineering juniors      |

## ***TECHNICAL PROJECTS***

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### **Medical Pressure Mat – BYU Global Engineering Outreach**

- Led electrical and software design for an Arduino-based pressure mat using conductive fabric sensors to monitor pressure distribution for at-risk wheelchair users
- Conceived and developed the system from initial concept to working prototype, integrating real-time visualization of pressure zones across the mat
- Presented prototype and system functionality to clinical stakeholders at a self-funded wheelchair clinic in South America as part of junior-year capstone project

### **Line-Following Robot – Top 5 in BYU Mechatronics Competition**

- Led software development in C, implementing closed-loop PID control for autonomous navigation and multi-sensor task execution
- Designed and tuned navigation algorithms for real-time obstacle handling and course optimization

### **Pipsqueak Air Engine – Precision Machining Project**

- Machined and assembled a high-performance air-powered engine using precision milling and turning operations; achieved best-performing engine in class section
- Created full engineering report including CAD models, detailed manufacturing process sheets, and redesign recommendations for non-machining component fabrication
- Gained hands-on experience in machining, assembly, tolerance control, and prototype performance optimization

### **Homemade DC Motor – Team Lead**

- Built and experimentally characterized a custom DC motor, leading mechanical design and fabrication
- Modeled dynamic motor behavior in MATLAB; analyzed experimental results against predictions for system validation, and plan to use an inverse PINN to identify the system parameters further

### **Water Ballast Design – BYU Rocketry Experimental High Power Competition Team**

- Served as Payload Engineer on BYU's first hybrid motor rocket team
- Designed and validated a water ballast system for flight stability and landing velocity for the inaugural team competition

### **Personal Software Projects**

- Developed multiple individual projects in C/C++, Python, MATLAB, and Java, including simulations, control systems, and data processing tools

## ***RELEVANT COURSEWORK & SKILLS***

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**Robotics & Control:** ROS 2 (Nav2, SLAM Toolbox, ROS 2 Control, MoveIt 2), Control Theory (PID, State-Space, Observers, MPC, LQR), State Estimation, Mechatronics, Dynamic System Modeling, Kinematics, Deep Learning

**Mechanical Design & Analysis:** Solidworks (Certified Professional, Sheet Metal), Ansys FEA, Mechanical System Design, Thermodynamics, GD&T, 3D Printing

**Electrical & Embedded Systems:** Arduino, ESP32, STM32, FreeRTOS, Electrical Circuit Design, PCB Design

**Programming:** C/C++, Python, MATLAB, Java, Git

**Certifications:** Certified SolidWorks Professional (CSWP), SolidWorks Sheet Metal Specialist