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 | Emphasis in controls and mechatronic systems | Highest ranked student in ME department

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

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

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

HONORS & AWARDS

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

TECHNICAL PROJECTS

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

Robotics & Control: ROS 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