

Ian Lansdowne

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EDUCATION

Texas A&M University

Bachelor of Science in Mechanical Engineering

College of Engineering

Honors: Craig and Galen Brown Engineering Honors, J. Mike Walker '66 Impact Award, Michael Berman '82 Scholarship, Dean's Honor Roll

Relevant Coursework: Mechanics of Robotic Manipulators, Dynamics and Modelling of Mechatronic Systems, Machine Learning

College Station, Texas

Dec 2025

Cumulative GPA: 3.94

RESEARCH EXPERIENCE

Control and Robotics Laboratory (CtrlRobot)

College Station, Texas

Undergraduate Researcher

Jan 2025 – Dec 2025

Advisor: Dr. Minghui Zheng

- Designed a low-cost, tendon-driven anthropomorphic robotic hand for fruit picking and manipulation of soft and heterogeneous objects, focusing on compliant contact and manufacturability.
- Directed a team of undergraduate researchers in developing a modular and reconfigurable finger architecture enabling rapid adaptation to new grasp types and object geometries.
- Developed and evaluated tendon routing, joint flexibility, and material selections to balance grasp strength with gentle interaction for agricultural robotics.
- Preparing a publication on reconfigurable gripper design for IEEE.

Nanorobotics, Energy Harvesting and Sensing Lab (NES)

College Station, Texas

Undergraduate Researcher (Senior Capstone)

Jan 2025 – Dec 2025

Faculty Sponsor: Dr. Ya Wang

- Contributed *ComSole*, a smart insole integrating IMU sensing, haptic cuing, and onboard machine learning (ML) to detect and mitigate Freezing of Gait (FoG) in Parkinson's patients in real time.
- Fabricated 3D-printed TPU insoles optimized for comfort, durability, and robust sensor mounting.
- Defined embedded system requirements including sensing, feedback, and power needs, and worked with the NES lab to produce a production-ready PCB.
- Developed firmware for ESP-32 to collect timestamped IMU data, stream over Bluetooth Low Energy (BLE), and classify FoG events with high accuracy using embedded ML.

Robotics and Automation Design Laboratory (RAD)

Bryan, Texas

Faculty Sponsor: Dr. Robert Ambrose

Undergraduate Researcher: Robotic Space Simulator (RSS)

May 2024 – Aug 2024

- Developed software to control a physical robotic space simulator consisting of two Stewart Platforms, each with a translational or revolute auxiliary axis, and mounted satellites to simulate inter-spacecraft dynamics on Earth.
- Co-authored a paper on the dynamics of spacecraft simulation, accepted to ICRA 2025.
- Formulated methods to calculate mass properties of a satellite attached to a force-torque sensor on a Stewart Platform.
- Derived an algorithm to compensate for mass effects of a spacecraft mounted on a 6 DoF force-torque sensor.
- Developed a new workflow for ROS in Docker on Real-Time Linux/WSL to package and test robot code outside the robot computer.
- Designed and 3D printed a compliant robotic arm mock-up in SolidWorks to test 0G dynamics without risking over \$60,000 of hardware.

- Developed a control system and firmware for a pendulum-driven inflatable ball robot to research the effects of internal pressure on surface traction, for use in exploring craters on the Moon.
- Produced a ROS Docker development environment and robot system images for Nvidia Jetson Nano and Raspberry Pi to allow for local development and remote deployment of configured ROS workspaces.
- Wrote a ROS package and library for the ODrive Pro motor controller in C++
- Derived pendulum 3D joint angles from IMU measurements.

PUBLICATIONS

- [1] Hilburn, E., Pettinger, A., Wilkinson, E., **Lansdowne, I.**, Ambrose, R., “Robotic Space Simulator: Controls Implementation for Auxiliary Axes and Zero-G Dynamics”. In: *2025 IEEE International Conference on Robotics and Automation (ICRA)*. 2025 IEEE International Conference on Robotics and Automation (ICRA). Atlanta, GA, USA: IEEE, May 19, 2025, pp. 14624–14630. ISBN: 979-8-3815-4139-2. doi: 10.1109/ICRA55743.2025.11128455.

PRESENTATIONS

- [1] **Lansdowne, I.**, Bucknor-Smartt, Z., Dominguez, O., “TURTLE Quadruped Project (QUAD)”. Texas Regional Robotics Symposium. College Station, Texas, USA, Apr. 30, 2024.

INDUSTRY EXPERIENCE

S&K Engineering and Research/NASA

Houston, Texas

*Technical Intern**Mar 2023 – Present*

- Maintained and improved of NASA’s FIRST Robotics Grants website in PHP, MySQL, JavaScript to distribute grants to over 400 high school robotics teams.
- Supported three successful seasons of grant applications with few reported issues.
- Contributed to the design of Team 118’s Robonauts Everybot, an accessible, low-cost FRC robot that impacted over 1,900 FIRST Robotics Competition teams and helped raise the competitive baseline across the league.

NASA Office of STEM Engagement, ER3 HumanWorks Lab

Houston, Texas

*Research Intern**Jun 2025 – Aug 2025*

- Optimized cable-driven gravity offload device design, improving simulation accuracy for Moon/Mars gravity training on NASA’s reduced gravity simulator, ARGOS
- Analyzed motor characteristics and kinematic properties to inform device design optimizations.
- Built testbed to measure brushless DC motor characteristics to select and validate a motor meeting design requirements.
- Modified ODrive S1 motor controller firmware and GUI for custom force control, allowing direct control of the cable tension.

Texas A&M University Department of Mechanical Engineering

College Station, Texas

*Student Ambassador**Feb 2025 – May 2025*

- Led facilities tours and represented the Mechanical Engineering Department to prospective and current students, explaining academic programs, lab spaces, and undergraduate opportunities.
- Assisted front desk operations, managed visitor inquiries, and supported departmental events to ensure a positive experience for guests.
- Provided guidance and resources to prospective students about coursework, research involvement, and student organizations based on personal experience in the program.

LEADERSHIP

- Scaled TURTLE Robotics into Texas A&M's largest robotics student organization with 330 members.
 - Approved and funded 21 unique advanced robotics projects proposed by undergraduate students.
 - Expanded outreach and development programs including the TURTLE Hatchling program to teach robotics skills to underclassmen.
 - Secured over \$20,000 in organization funding through proposals to the department, college, and corporate sponsors, and through member dues.
 - Introduced design reviews for projects to monitor progression and promote documentation of projects.
 - Constructed and supported a team of 40 officers across four branches to fulfill internal, external, developmental, and project-centric duties.
 - Hosted a conference-style project showcase featuring all 21 active TURTLE projects, drawing strong attendance from Mechanical Engineering faculty, students, and campus partners.

Project Lead: OUAD

Jan 2023 – Present

- Proposed and led a team of 10+ undergraduate students in designing three iterations of a low cost quadrupedal robot to explore the capabilities of legged robots.
 - Derived inverse kinematics and programmed quadrupedal robots with custom gait control in Python and C++.
 - Presented a poster showcasing the quadrupedal robot designs for Texas Robotics Symposium (TEROS) 2024.

Internal Vice President

Aug 2024 – May 2025

- Oversaw finances, logistics, web development, and applications; led officer meetings and managed internal communication.

Logistics Officer

Aug 2023 – May 2024

- Directed admissions, events, and lab expansion during 200%+ membership growth (70 to 160 members).

SKILLS

Software: Proficient in Bash, C, C++, Java, JavaScript, MATLAB, PHP, Python (NumPy, SymPy, Pandas), SQL

Technical: Proficient with CAD (Solidworks, Creo, Fusion 360), Docker, Git, L^AT_EX, Linux, Machine Learning, ROS, Web Design