Ian Lansdowne

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EDUCATION

Texas A&M University College Station, Texas

Bachelor of Science in Mechanical Engineering *Dec 2025*

College of Engineering *Cumulative GPA: 3.97*

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

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 rouust 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.

Undergraduate Researcher: RoboBall II *May 2023 – Aug 2023*

- 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: 979-8-3315-4139-2. 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

Texas A&M University Robotics Team and Leadership Experience (TURTLE) College Station, Texas

President *May 2025 – Present*

- 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: QUAD *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, LaTeX, Linux, Machine Learning, ROS, Web Design