

Aleksandar Bošković

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EDUCATION

Georgia Institute of Technology - Atlanta, GA

Expected May 2026

Bachelor of Science in Mechanical Engineering

Thesis: *A Framework for Evaluating Physical Human-Robot Interface Design (expected Spring 2026)*

Overall GPA: 4.00 / 4.00

AWARDS & HONORS

Chair's Ambassadors in Leadership and Service Fellowship: Fall 2025

Faculty Honors: Spring 2025, Fall 2024, Spring 2024, Fall 2023, Spring 2023, Fall 2022

President's Undergraduate Research Award: Summer 2024

RESEARCH INTERESTS

Human-Robot Interaction; Wearable Robotics; Haptics; Surgical Robotics; Medical Devices

PUBLICATIONS

1. Mhaskar, Y., Park, D., **Bošković, A.**, Young, A. (December 2025). "Ergonomic Robotic Hip Exoskeleton Design with Integrated Second-Skin On-Body Sensing." *Submitted to IEEE Robotics and Automation Letters*.
2. Alshareef, A., **Bošković, A.**, Houle, D., Kousik, S., Sawicki, G. (Expected December 2025). "Design and Validation of a Robotic Dynamometer to Measure Dynamic Human Work Loop and Force Control." *Manuscript in preparation*.

PRESENTATIONS

1. **Bošković, A.**, Mhaskar, Y., Young, A. (October 2025). "A Planar Mobility Mechanism for Secure and Comfortable Exoskeleton Thigh Interfaces." *Oral Presentation at the Gulf Coast Undergraduate Research Symposium (GCURS), Rice University*.

RELEVANT PROJECTS

V6 Robotic Hip Exoskeleton, Exoskeleton and Prosthetic Intelligent Controls Lab Aug 2023 - Present

- Designed and manufactured novel thigh interface with a passive 3-DOF planar mobility mechanism that mitigates skin irritation caused by misalignment between the hip joint and actuator axes.
- Utilized SolidWorks FEA to improve structural design of thigh struts while reducing mass by over 35%.
- Fabricated rapid prototypes using SLS/SLA/FDM 3D printing and manufactured final components using wet-laminated and prepreg carbon-fiber layups.
- Collected kinematic datasets from able-bodied and stroke-impaired participants using VICON across cyclic and non-cyclic locomotor tasks.
- Built multimodal motion-capture datasets (infrared markers, force plates, EMG, IMUs, insole pressure, gait mapping) and automated validation tools in MATLAB to rapidly flag gaps in data and erroneous trials.
- Performed clinical evaluations of stroke participants using the Fugl-Meyer Assessment, enabling correlation of movement data with severity of impairment.
- Coordinate a team of undergraduate researchers by mentoring new members, supporting development of teammates' technical and research skills, and facilitating communication with lab faculty.

Dynamic Simulation of Hip-Knee Joint Mechanics, ME3017: System Dynamics Jan 2025 - May 2025

- Developed double-pendulum model of the human hip and knee using torsional springs and dampers at each joint to model ligamentous stiffness, muscle damping, and gravitational effects on the thigh and shank.
- Used anthropometric data from biomechanics literature to derive differential equations of motion and linearized them about equilibrium to analyze stability, frequency response, and transient behavior.

- Simulated input torques representing a martial-arts kick, a soccer strike, and rehabilitative cycling, and compared nonlinear and linearized system responses using MATLAB.

Robotic Dynamometer, Physiology of Wearable Robotics Lab

Aug 2024 - May 2025

- Identified and corrected design flaws in an open-source ankle work-loop observation platform, increasing structural rigidity to better secure the force plate and isolate soleus muscle activity.
- Designed a custom motor-driven dynamometer rig in Fusion 360 to replace a weight stack and enable testing under variable-speed and complex loading conditions.
- Selected motor and gearbox components capable of safely exceeding human plantar-flexion torque across all speeds by generating torque-speed curves in MATLAB, thereby enabling isokinetic testing.
- Fabricated aluminum brackets and structural bars using a waterjet and drill press; designed a reinforced motor mount for assembly via welding to reduce frame bending and inertial effects; machined steel hard-stop bars to prevent ankle overextension.

Design and Control of an Autonomous Robot, ME2110: Creative Decisions and Design

Jan 2024 - May 2024

- Programmed an autonomous robot's control system in Arduino, integrating IR/ultrasonic sensing with motor, solenoid, and pneumatic actuation to execute competition tasks.
- Designed a low-profile scissor lift extending 4.5 feet from a collapsed height of 4 inches and machined a custom aluminum spool on a lathe to drive the lift cable.
- Built a rapid-deploy obstacle-clearing mechanism using drawer slides and pneumatic actuation to secure scoring zones during competition.

OTHER RELEVANT EXPERIENCE**Process Development Intern**, Boston Scientific

May 2025 - Aug 2025

- Enhanced fidelity and operation speed of a laser ablation system for feedthrough manufacturing by developing an empirically driven marking file, reducing cycle time by 64% and saving over 2300 machine hours (>3.3 months) annually.
- Conducted root cause analysis on heat-affected zones using SEM and collaborated with cross-functional teams to enhance process robustness and scalability.
- Measured sputtered-ceramic layer thickness using XRF in multiple orientations and performed statistical analysis in Minitab (t-test), confirming orientation-dependent variation and revealing a critical source of testing error.

Campus Relations & Events Committees, Undergraduate Research Ambassadors

Jan 2025 - Present

- Proposed, organized, and hosted workshops connecting students with GT's Office of Undergraduate Education & Student Success to demystify graduate/medical school pathways and competitive fellowships.
- Support campus research programming by staffing undergraduate research fairs, coordinating lab tours, and advising students during weekly office hours on identifying and contacting potential research mentors.

Lab Supervising Grader, ME2110: Creative Decisions and Design

Aug 2024 - May 2025

- Supervised lab sessions and coached students through the design, construction, and control of robotic devices for ME2110.
- Trained students on Arduino-based control of mechatronic systems and ensured safe, effective use of laser cutters, 3D printers, and other rapid-prototyping tools during lab operations.

Undergraduate Volunteer, Georgia Tech Robotics Summer Institute

Jul 2024

- Guided high school students in building autonomous robots and programming Arduino-based control systems for a final team competition.
- Moderated a student panel to advise participants on college admissions and STEM pathways.

Prototyping Instructor, Flowers Invention Studio

Jun 2024 - Present

- Train students and faculty on safe and effective use of shop tools and rapid-prototyping equipment, supporting fabrication of course, research, and personal projects.
- Instruct users in manufacturing methods such as woodworking, metalworking, 3D printing, electronics prototyping, and laser cutting.

Hytech Racing, Driver Controls Team

Aug 2022 - Dec 2023

- Evaluated ergonomic dashboard-control designs under varying driver conditions (glove types, control placement, device size) to improve usability and reduce risk of human error during competition.
- Designed lightweight harness-mount spacers and custom brake-fluid reservoir fittings, machining components on a lathe and drill press and producing associated engineering drawings.

RELEVANT COURSEWORK

Robotics; Machine Design; System Dynamics; Statistics & Applications; Data Structures & Algorithms; Experimental Methods & Technical Writing; Creative Decisions & Design; Undergraduate Research & Proposal Writing

SKILLS

Programming: MATLAB, Arduino, Python, Java

Design: SolidWorks, 3DEXPERIENCE CATIA, Fusion 360, Finite Element Analysis (FEA), Engineering Drawings

Analysis: Scanning Electron Microscopy (SEM), VHX Digital Microscopy, XRF Analysis, Minitab

Manufacturing: 3D Printing (FDM/SLA/SLS), Carbon-Fiber Layup, Laser Cutting, Metal Lathe, Waterjet, Femtosecond Laser Ablation