

Carlos A. Carrasquillo Torres

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Education

Georgia Institute of Technology | GPA: 3.9 / 4.0

- PhD Candidate, *Robotics*
- Master of Science, *Computer Science*, Machine Learning Specialization
- Master of Science, *Aerospace Engineering*

Aug 2021 – Present

Expected Spring 2026

May 2025

May 2025

University of Florida | GPA: 3.7 / 4.0

- Bachelor of Science, *Mechanical Engineering*, Magna Cum Laude Honors
- Bachelor of Science, *Computer Engineering*, Magna Cum Laude Honors

Aug 2017 – May 2021

May 2021

May 2021

Research Experience

Graduate Research Fellow | Georgia Institute of Technology, Institute for Robotics and Intelligent Machines

Aug 2021 – Current

Location: Atlanta, GA

Lab: DART Lab and EPIC Lab

Advisors: Anirban Mazumdar, PhD, Aaron Young, PhD

- Designed and implemented real-time closed-loop control systems for highly non-linear, multi-DOF wearable robotic platforms for unstructured and dynamic activities while enforcing strict safety constraints.
- Developed model-based and data-driven exoskeleton controllers, including impedance, adaptive, and end-to-end torque controllers, and validated on hardware in 200+ human-in-the-loop experiments.
- Performed state estimation using extended Kalman filters to infer latent states from noisy, partially observed sensor data.
- Conducted trajectory planning for both human locomotion and 6-DOF aircraft models.
- Deployed deep learning-based models (TCNs, VAEs, CNNs, Transformers, PPO) for physiological state estimation into exoskeleton control stacks.
- Designed and implemented mechatronics, including custom PCBs, sensors, and actuators, and validated in hardware tests.
- Built real-time exoskeleton software, including multiprocessing controller frameworks, communication packages, and GUIs.
- Developed AR/VR games and conducted human studies with real-time biofeedback using EMG and motion capture.

Undergraduate Research Assistant | University of Florida, Dept of Mechanical and Aerospace Engineering

Jan 2019 – Aug 2021

Location: Gainesville, FL

Lab: ADAMUS Lab

Advisors: Riccardo Bevilacqua, PhD

- Developed embedded C++ avionics software for the D3 CubeSat, creating custom libraries to interface with the satellite's IMU, antenna, radio, and GPS on an Ubuntu microcomputer.
- Developed a Python-based ground station application to manage satellite communications.
- Designed satellite circuit boards and CNC-machined parts for custom actuators.

Industry Experience

Software & Mechanical Engineering Intern

May 2021 – April 2023

Location: Dallas, TX

Company: RTX

Advisors: Chris Bender, Malia Kawamura

- Developed a web application that streamlined component discovery on printed circuit boards for engineers.
- Designed and deployed assembly line programs and dashboards to monitor and optimize production-grade machinery.
- Automated a manual material testing process by building a desktop application, improving data logging and tracking efficiency.



Teaching Experience

Teaching Assistant—Vertically Integrated Projects (VIP) | Georgia Institute of Technology

Aug 2021 – Current

Semesters: Fall 2021 — Current

Course Instructors: Anirban Mazumdar, PhD; Aaron Young, PhD

Team: Robotic Human Augmentation

Led and mentored a team of 16 undergraduate students performing research in the following areas:

- Designing exoskeleton hardware, including orthosis and mechatronics
- Creating exoskeleton controllers, from traditional impedance control to more recent, deep learning-based strategies
- Conducting human-subject experiments
- Performing biomechanical analysis, including Vicon processing, OpenSim, and data-driven strategies
- Developing virtual reality games for demonstration and experimentation
- Developing energetically optimal path planning algorithms for human navigation

Senior Teaching Assistant—Design and Manufacturing Lab | University of Florida

May 2019 – May 2021

Semesters: Summer 2019, Fall 2019, Spring 2020, Summer 2020, Fall 2020, Spring 2021

Course Instructor: Mike Braddock

- Instructed over 30 students (in groups of 4-5 each semester) on design for manufacturing (DFM) principles, conducting design reviews and providing feedback on CAD models and technical drawings.
- Trained and certified students on shop equipment, including lathes, mills, welders, waterjets, and CNC machines.
- Managed and supervised a university machine shop, assisting researchers and design teams with part fabrication.
- Held quarterly seminars on advanced manual machining methods.
- Provided mentorship and instruction incoming teaching assistants to prepare them to lead their own sections.

Teaching Assistant—Dynamics and Control Systems Design Lab | University of Florida

Aug 2020 – Dec 2020

Semesters: Fall 2020

Course Instructors: Prabir Barooah, PhD; Shannon Ridgeway, PhD

- Lectured to students on applying classical control theory to real-world systems, guiding them through system identification, PID controller implementation on microcontrollers, and computer vision algorithm development.
- Instructed students on using LabVIEW for the design and control of actuated closed-loop systems.

Teaching Assistant—Thermal Sciences Design and Lab | University of Florida

Aug 2020 – Dec 2020

Semesters: Fall 2020

Course Instructor: John Abbitt, PhD

- Lectured and instructed students on the thermodynamics and operating principles of internal combustion engines.
- Guided student teams in designing mathematical models for internal combustion engines for the class final project through brainstorming and design review sessions.
- Prepared students for exams by conducting comprehensive in-class review sessions.

Teaching Assistant—Numerical Methods | University of Florida

May 2019 – Aug 2020

Semesters: Summer 2019, Summer 2020

Course Instructors: Jonathan Brooks, PhD; Georges Akiki, PhD

- Lectured on topics including iterative algorithms, linear algebra, numerical derivatives and integrals, Fourier analysis, polynomial regression, and splines.
- Created homework solutions, including answer keys, example software solutions, and grading rubrics.
- Prepared and presented in-class exam reviews.



Publications

- [J10] **C. Carrasquillo**, A. Mazumdar, A. Young. “Energetically Optimal Control of a Hip-Knee Exoskeleton Using Deep Learning-Based Control and Primitive-Based Optimization”. (In Prep)
- [J9] **C. Carrasquillo**, D. Chen, M. Gideon, A. Mazumdar. “Metabolically Optimal Route Planning for Human Navigation”. (In Prep)
- [J8] **C. Carrasquillo**, A. Mazumdar, A. Young. “Uncertainty-Aware Physiological State Estimation for Wearable Robotics”. (In Prep)
- [J7] **C. Carrasquillo**, S. Leapley, R. Casey, C. Nuesslein, G. Sawicki, A. Mazumdar, A. Young. “Reducing Joint Loading and Metabolic Energy Expenditure in Manual Labor Tasks using a Robotic Hip-Knee Exoskeleton”. (Internal Review)
- [J6] **C. Carrasquillo**, B. Hanna, A. Mazumdar, A. Young. “Intuitive Steering Assistance from a Robotic Exoskeleton for Visually Impaired Navigation”. (Internal Review)
- [J5] C. Nuesslein, R. Casey, S. Leapley, **C. A. Carrasquillo**, G. Sawicki, A. Mazumdar, A. Young. “Generalizing Robotic Assistance for Heavily Augmented Movement to Reduce Joint Loading with a Knee Exoskeleton”. (Internal Review)
- [J4] K. L. Scherpereel, M. C. Gombolay, M. K. Shepherd, **C. A. Carrasquillo**, O. T. Inan, A. J. Young. “[Deep Domain Adaptation Eliminates Costly Data Required for Task-Agnostic Wearable Robotic Control](#)”. Science Robotics. 2025.
- [J3] **C. Carrasquillo**, A. Bajpai, D. Iyengar, K. Collins, A. Mazumdar, A. Young. “[Enhancing Human Navigation Ability Using Force-Feedback from a Lower-Limb Exoskeleton](#)”. IEEE Transactions on Haptics. 2025.
- [J2] **C. Carrasquillo**, S. Zhou, W. L. Childers, A. Young, K. Herrin. “[A Clinical Decision-Making Algorithm for the Personalized Prescription of Microprocessor-Controlled Prosthetic Knees: An Evidence-Based Approach based on a Randomized Trial](#)”. Prosthetics and Orthotics International. 2025.
- [J1] A. Bajpai, **C. Carrasquillo**, J. Carlson, J. Park, D. Iyengar, K. Herrin, A. Young, A. Mazumdar. “[Design and Validation of a Versatile High Torque Quasi-Direct Drive Hip Exoskeleton](#)”. IEEE Transactions on Mechatronics. 2023.
- [C2] **C. Carrasquillo**. “[A Versatile and Open-Source Radio Framework for the D3 CubeSat Mission](#)”. Small Satellite Conference. 2021. Student Competition Best Paper Honorable Mention.
- [C1] S. Buckner, **C. Carrasquillo**, M. Elosegui, R. Bevilacqua. “[A Novel Approach to CubeSat Flight Software Development Using Robot Operating System \(ROS\)](#)”. Small Satellite Conference. 2020.

Presentations

- [P6] **C. Carrasquillo**, A. Bajpai, A. Mazumdar, L. Ting, A. Young. “Unsupervised Discovery of Human Motion Primitives from Biomechanical Data”. American Society of Biomechanics. August 2025.
- [P5] **C. Carrasquillo**, A. Bajpai, D. Iyengar, K. Collins, A. Mazumdar, A. Young. “Enhancing Human Navigation Ability Using an Active Wearable Exoskeleton”. IEEE World Haptics. July 2025.
- [P4] K. Herrin, **C. Carrasquillo**, S. Zhou, W. L. Childers, A. Young. “A Clinical Decision Equation for the Personalized Prescription of Prosthetic Microprocessor Knees”. The American Orthotic and Prosthetic Association. September 2024.
- [P3] **C. Carrasquillo**, K. Herrin, S. Zhou, W. L. Childers, A. Young. “Toward data driven prescription personalization of microprocessor prosthetic knees”. Military Health System Research Symposium. August 2024.
- [P2] **C. Carrasquillo**, “Towards Functional Exoskeleton Control”. The National Defense Science and Engineering Graduate Fellowship Conference. July 2024.
- [P1] **C. Carrasquillo**, A. Bajpai, D. Iyengar, K. Collins, A. Mazumdar, A. Young. “Enhancing Human Navigation Ability Using an Active Wearable Exoskeleton”. American Society of Biomechanics. August 2023.



Fellowships and Awards

▪ Georgia Space Grant Consortium Fellow	Aug 2025 – Current
▪ Grad REACH Scholar	Aug 2024 – Current
▪ National Defense Science and Engineering Graduate (NDSEG) Fellow	Aug 2022 – Aug 2025
▪ Pathbreakers Fellow (formerly University Center of Exemplary Mentoring)	Aug 2023 – May 2025
▪ Florida Academic Scholars Award	Aug 2017 – May 2021
▪ SwampHacks VI Infinite Energy's Best Hack Award	Jan 2020

Extracurriculars

▪ Private Pilot (100 hours)	July 2023 – Current
▪ PADI Advanced Open Water Diver	July 2023 – Current
▪ Georgia Tech Marching Band/Drumline: Snare Drum	July 2023 – May 2024

Skills

- **Programming:** Python (NumPy, Pandas, OpenCV, PyTorch, TensorFlow, ROS/ROS2, OpenMDAO), C/C++, C# (Unity), High-Performance Computing (HPC), JavaScript (React.js, MongoDB, Express.js, Node.js), MATLAB, Simulink, VBA, VHDL
- **Design & Manufacturing:** Altium Designer (PCB), SolidWorks (CAD, FEA), Fusion 360 (CAD/CAM), Machine Shop Equipment (Lathes, Mills, CNC, Welding), Rapid Prototyping
- **Experimentation:** AR/VR, Electromyography, Metabolics (COSMED, Parvo), Motion Capture (Vicon), OpenSim
- **Miscellaneous Projects:** reinforcement learning-based aircraft landing autopilot, microprocessor knee recommendation algorithm, bioreactor pump controller, 12-degree-of-freedom quadruped robot, 3D bioprinter, desktop lathe, MIPS CPU, assortment of websites
- **Certifications:** Amateur Radio Technician (2019, KN4ZUC), SolidWorks Associate (2020), Private Pilot (90+ hours), Advanced Open Water Diver
- **Languages:** English and Spanish

Community Involvement

▪ Georgia Tech Robotics Summer Scholars (GTRSS) Summer Camp Organizer	2023, 2024, 2025
▪ 2025 IEEE International Conference on Robotics and Automation Volunteer	May 2025
▪ Elementary School Science Fair Judge	Nov 2022, 2023
▪ Atlanta Science Festival Volunteer	Mar 2022, 2023
▪ American Controls Conference Volunteer	Jun 2022
▪ National Biomechanics Day Organizer	Feb 2022, 2023