

# Carlos A. Carrasquillo Torres

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## Education

<b>Georgia Institute of Technology</b>   GPA: 3.9 / 4.0	<b>Aug 2021 – Present</b>
▪ PhD Candidate, <i>Robotics</i>	Expected Spring 2026
▪ Master of Science, <i>Computer Science</i> , Machine Learning Specialization	May 2025
▪ Master of Science, <i>Aerospace Engineering</i>	May 2025
<b>University of Florida</b>   GPA: 3.7 / 4.0	<b>Aug 2017 – May 2021</b>
▪ Bachelor of Science, <i>Mechanical Engineering</i> , Magna Cum Laude Honors	May 2021
▪ Bachelor of Science, <i>Computer Engineering</i> , Magna Cum Laude Honors	May 2021

## Research Experience

<b>Graduate Research Assistant</b>   Georgia Institute of Technology, Institute for Robotics and Intelligent Machines	<b>Aug 2021 – Current</b>
<b>Location:</b> Atlanta, GA	
<b>Lab:</b> DART Lab and EPIC Lab	
<b>Advisors:</b> Anirban Mazumdar, PhD, Aaron Young, PhD	
▪ Applied deep learning techniques (TCNs, VAEs, CNNs, GANs, Transformers, PPO) to estimate human motion, biological moments, and other physiological states.	
▪ Developed and validated novel exoskeleton controllers, including impedance-based, primitive-based, uncertainty-aware, and end-to-end biological torque controllers.	
▪ Designed mechatronics components, including PCBs, sensor drivers, and orthoses components for several exoskeletons.	
▪ Built real-time exoskeleton software, including multiprocessing controller frameworks, communication packages, and GUIs.	
▪ Created VR/AR games in Unity to provide real-time biofeedback and simulate unstructured environments for human studies.	
▪ Conducted human-subject experiments using EMG, motion capture, metabolic systems, and AR/VR headsets.	

<b>Undergraduate Research Assistant</b>   University of Florida, Dept of Mechanical and Aerospace Engineering	<b>Jan 2019 – Aug 2021</b>
<b>Location:</b> Gainesville, FL	
<b>Lab:</b> ADAMUS Lab	
<b>Advisors:</b> 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 a BeagleBone Black microcomputer [C1, C2].	
▪ Developed a Python-based ground station application to manage satellite mission operations, enabling reliable telecommand transmission and downlink data acquisition.	

## Industry Experience

<b>Software &amp; Mechanical Engineering Intern</b>	<b>May 2021 – April 2023</b>
<b>Location:</b> Dallas, TX	
<b>Company:</b> RTX	
<b>Advisors:</b> Chris Bender, Malia Kawamura	
▪ Engineered a MERN stack web application that streamlined component discovery on printed circuit boards for engineers.	
▪ Designed and deployed five process programs and Splunk dashboards to monitor and optimize production-grade machinery.	
▪ Automated a manual material testing process by building a VBA-based desktop application, improving data logging and tracking efficiency.	



## Teaching Experience

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### 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

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- [J9] **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)
- [J8] **C. Carrasquillo**, D. Chen, M. Gideon, A. Mazumdar. “Metabolically Optimal Route Planning for Human Navigation”. (In Prep)
- [J7] **C. Carrasquillo**, A. Mazumdar, A. Young. “Uncertainty-Aware Physiological State Estimation for Wearable Robotics”. (In Prep)
- [J6] **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)
- [J5] **C. Carrasquillo**, B. Hanna, A. Mazumdar, A. Young. “Intuitive Steering Assistance from a Robotic Exoskeleton for Visually Impaired Navigation”. (Internal Review)
- [J4] K. L. Scherpercel, 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

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- [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

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

## Extracurriculars

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|---------------------------------------------------|-----------------------------|
| ▪ PADI Advanced Open Water Diver                  | <b>July 2023 – Current</b>  |
| ▪ Private Pilot (90+ hours)                       | <b>July 2023 – Current</b>  |
| ▪ Georgia Tech Marching Band/Drumline: Snare Drum | <b>July 2023 – May 2024</b> |

## Skills

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- **Design & Manufacturing:** Altium Designer (PCB), SolidWorks (CAD, FEA), Fusion 360 (CAD/CAM), Machine Shop Equipment (Lathes, Mills, CNC, Welding), Rapid Prototyping
- **Programming:** Python (NumPy, Pandas, OpenCV, PyTorch, TensorFlow, ROS/ROS2, OpenMDAO), C/C++, C# (Unity), JavaScript (React.js, MongoDB, Express.js, Node.js), MATLAB, Simulink, VBA, VHDL
- **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

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