

# Juan-Diego Florez

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## Education

### Doctor of Philosophy in Robotics

Georgia Institute of Technology, Atlanta, GA

Advisor: Dr. Frank Dellaert

Aug. 2020 – May 2024

### Master of Science in Robotics Engineering

Worcester Polytechnic Institute, Worcester, MA

Advisor: Dr. Marko Popovic

– Bruce Manooch Space Research Fellow

Aug. 2018 – May 2020

### Bachelor of Science in Mechanical Engineering, *Magna Cum Laude*

Florida Institute of Technology, Melbourne, FL

– Tau Beta Pi Engineering Honor Society

Aug. 2014 – May 2018

## Professional Experience

### Georgia Institute of Technology, Borg Lab

Atlanta, GA

*Graduate Research Assistant – Robotics Estimation and Control*

Jan. 2021 – Present

- Applied human-like trajectory modeling to artistic motion tasks using GTSAM factor graph optimization (Python, C++)
- Implemented impedance controller (ROS, C++) for haptic teleoperation of the Franka Emika Panda manipulator
- Contributed to the mechanical design and evaluation of cable-driven parallel robot used to create graffiti art (accepted to ICRA 2022)

### Independent Research

Atlanta, GA

*Researcher – General Analytical Inverse Kinematics Solver*

Jan. 2019 – Present

- Developed a novel analytical inverse kinematic solver (MATLAB, C++) for 7-DOF robotic manipulators with joint offsets in collaboration with another researcher
- Implemented solver on the Franka Emika Panda arm, generating up to 16 solution joint configurations

### Georgia Institute of Technology, Space Systems Design Laboratory

Atlanta, GA

*Student Researcher – Vertical Entry Robot for Navigating Europa (VERNE)*

Aug. 2020 – Dec. 2020

- Worked in two teams to develop the mechanical design of both the anchoring system and the drill for the VERNE robot

### Worcester Polytechnic Institute, Popovic Lab

Worcester, MA

*Graduate Research Assistant – Compact Robotic Flow Control Valve*

June. 2019 – Sept. 2019

- Mentored a team of 2 to design and optimize a CAM-like valve (MATLAB, SolidWorks) for fluid-based actuation
- Implemented the valve in a humanoid walking robot actuated synthetic muscle actuators (accepted to BIODEVICES 2020)

### GT, WPI, FIT

FL, MA, and GA

*Teaching Assistant*

2017 – 2020

- Robot dynamics and kinematics, introduction to calculus, and introduction to physics

## Academic Experience

### Novel Bidirectional Elastic Nonlinear Element for Robotic Antagonistic Actuation

Worcester, MA

*MS Thesis, Trans-Gravitational Robot, advised by Dr. Marko Popovic*

Aug. 2019 – Sept. 2020

- Created a method for designing a novel, scalable, nonlinear elastic actuation element and implemented it in a joint actuated by an antagonistic, variable-stiffness actuator
- Worked in a team of two to design limbs capable of both locomotion and manipulation

### Mars Multi-Rover System

Melbourne, FL

*BS Capstone Project, advised by Dr. Beshoy Morkos and sponsored by JPL*

Sept. 2017 – July 2018

- Led a multi-disciplinary team of 20+ and applied MBSE principles in development of two mini rovers (SolidWorks, ANSYS Workbench, C++), each with a 5-DOF manipulator
- Implemented robot vision and pose control for manipulation and tool change tasks

## Publications

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- [1] Chen, Gerry & Baek, Sereym & **Florez-Castillo, Juan-Diego** & Qian, Wanli & Leigh, Sang-won & Hutchinson, Seth & Dellaert, Frank. (2021). GTGraffiti: Spray Painting Graffiti Art from Human Painting Motions with a Cable Driven Parallel Robot. (Accepted ICRA 2022)
- [2] D'Agostino, J. & Clarrissimeaux, E. & Moffat, S. & **Florez-Castillo, J. D.** & Sanchez, F. & Bowers, M. & Popovic, M. B., “Novel Compact Robotic Flow Control Valve for Bioinspired Exosuit and Other Applications,” Biomedical Engineering Systems and Technologies. Springer International Publishing, pp. 17–38, 2021. doi: 10.1007/978-3-030-72379-8\_2.
- [3] D'Agostino, J. & Clarrissimeaux, E. & Moffat, S. & **Florez-Castillo, J. D.** & Sanchez, F. & Bowers, M. & Popovic, M. B., “Development of Bioinspired Exosuit Actuated with Hydro Muscles and Novel Compact Robotic Flow Control Valve,” Proceedings of the 13th International Joint Conference on Biomedical Engineering Systems and Technologies. SCITEPRESS - Science and Technology Publications, 2020. doi: 10.5220/0008948600400049.