Juan-Diego Florez

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Education

Doctor of Philosophy in Robotics
Georgia Institute of Technology, Atlanta, GA

Aug. 2020 – May 2024
Advisor: Dr. Frank Dellaert

Master of Science in Robotics Engineering
Worcester Polytechnic Institute, Worcester, MA
− Bruce Manooch Space Research Fellow

Aug. 2018 – May 2020
Advisor: Dr. Marko Popovic

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
Advisor: Dr. Beshoy Morkos

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 design and evaluation of a cable-driven parallel robot used to create graffiti art (accepted to ICRA 2022)

Independent Research — Atlanta, GA
Researcher – General Analytical Inverse Kinematics (IK) Solver — Jan. 2019 – Present
− Developed, in a team of two, a novel analytical IK solver (MATLAB, C++) for 7-DOF robotic manipulators with joint offsets
− 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 design (SolidWorks) 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 two 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 and configuring a scalable, nonlinear elastic actuation element and implemented it in an antagonistic, variable-stiffness actuation scheme on a limbed robot
− Designed, in a team of two, a limb (SolidWorks) capable of both manipulation and locomotive tasks (e.g. walking or hopping)

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

[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.