

IVAN DARIO JIMENEZ RODRIGUEZ

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EDUCATION

California Institute of Technology, Pasadena, CA

PhD in Computing and Mathematical Sciences (3.50/4.00 GPA)

Graduate May 2025

Georgia Institute of Technology, Atlanta, GA

M.S. Computer Science (3.92/4.00 GPA)

Graduate May 2019

B.S. Computer Science (3.64/4.00 GPA)

Graduate December 2016

RESEARCH INTERESTS

Theory and applications at the intersection of Machine Learning and Control with focus on Computer Vision, Generative Modeling and Robotics.

EXPERIENCE

California Institute of Technology

October 2019 - Present

Graduate Research Assistant - Advised By Yisong Yue and Aaron Ames

Pasadena, CA

- Conducts fundamental research in learning and control.
- Developed and maintain open source implementations of research projects in (CPP/Python/Pytorch/ROS).
- Applications include safety-critical control, robotics, streaming perception and generative modeling.
- Application to physical systems include segways, bipeds, quadrupeds, and quadrotors.
- 6 Publications to date spanning robotics, perception & core learning, including the invention of a framework for training neural networks with control theoretic Lyapunov stability.

Carnegie Mellon University

May - August 2018

Research Assistant - Advised By Zico Kolter

Pittsburgh, PA

- Used PyTorch to implement and test an differentiable Model Predictive Control (MPC) pipeline with various simulated testing environments. This project resulted in 1 publication.

IRobot

May - August 2016 and January - August 2017

Research Internship

Bedford, MA

- Implemented a C++ fast sparse least-squares solver and a fixed-lag smoother for embedded SLAM that was 3 times faster on embedded platforms than the current state of the art GTSAM implementation.
- Reduced fiducial detection error by 50% for outdoor VSLAM robot platform.
- Implemented C++ joystick controller for manual driving of outdoor robot platform.

PUBLICATIONS

- Yujia Huang*, **Ivan D. Jimenez Rodriguez***, Huan Zhang, Yuanyuan Shi, Yisong Yue “FI-ODE: Certified and Robust Forward Invariance in Neural ODEs”. (In Review)
- Andrew Singletary, Aiden Swann, **Ivan D. Jimenez Rodriguez**, Aaron D. Ames “Safe Drone Flight with Time-Varying Backup Controllers”. (IROS 2022) (Finalist for Safety, Security, and Rescue)
- **Ivan D. Jimenez Rodriguez***, Noel Csomay-Shanklin*, Aaron D. Ames, Yisong Yue. Neural Gaits: Learning Bipedal Locomotion via Control Barrier Functions and Zero Dynamics Policies (L4DC 2022) (51 % Acceptance Rate)
- **Ivan D. Jimenez Rodriguez**, Aaron D. Ames, Yisong Yue. LyaNet: A Lyapunov Framework for Training Neural ODEs (ICML 2022)(21.9 % Acceptance Rate)
- Ryan Cosner*, **Ivan D. Jimenez Rodriguez***, Tamas G. Molnar, Wyatt Ubellacker, Aaron D. Ames, Katherine L. Bouman. Self-supervised Adaptive Uncertainty Estimation for Stereo Vision Based Safety Critical Control (ICRA 2022) (43 % Acceptance Rate)
- **Ivan D. Jimenez Rodriguez**, Ugo Rosolia, Aaron D. Ames, Yisong Yue. Learning to Control an Unstable System with One Minute of Data: Leveraging Gaussian Process Differentiation in Predictive Control (IROS 2021) (45 % Acceptance Rate)
- Silva, A., Killian, T., **Jimenez, I.**, Son, S. H. Gombolay, M. Optimization methods for interpretable differentiable decision trees applied to reinforcement learning. (AISTATS 2020)
- B. Amos, **I. D. Jimenez**, J. Sacks, B. Boots, Z. Kolter. Differentiable MPC for End-to-end Planning and Control. (NIPS 2018)(21% Acceptance Rate)

· **I. D. Jimenez.** A Factor Graph Approach To Constrained Optimization. (2016). (Thesis)

TEACHING EXPERIENCE - CS 6476 COMPUTER VISION

CDS233 Nonlinear Control	Professor: Gunter Niemeyer	Spring 2022
CDS232 Nonlinear Dynamics	Professor: Gunter Niemeyer	Winter 2022
ACM 104 Applied Linear Algebra	Professor: Kostia Zuev	Fall 2020
CS6476 Computer Vision	Professor: Irfan Essa	Head TA Fall 2018 and Spring 2019