

Cesar G. Santoyo

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Education

Georgia Institute of Technology

Doctor of Philosophy in Electrical & Computer Engineering

Atlanta, GA

December 2021 (expected)

Georgia Institute of Technology

Masters of Science in Electrical & Computer Engineering

Atlanta, GA

December 2019

University of Florida

Bachelor of Science in Aerospace Engineering, Minor in Mathematics

Gainesville, FL

December 2016

Work Experience

Sandia National Labs

Navigation, Guidance & Control Intern

Albuquerque, NM

June 2018 - August 2018

- Performed static analysis of legacy C++ flight software
- Collaborated on the development of advanced concept development tool aimed at streamlining legacy processes
- Upgraded legacy mission control operations software utilized during rocket launches

R&D Mechanical Engineering Intern

May 2014 - August 2015

- Designed and analyzed sounding rocket payload - the design was fabricated, launched, and recovered
- Provided product realization support to the engineering design team for vehicle integration
- Assisted with environmental testing for a different set of sounding rocket payloads

Raytheon

Guidance, Navigation & Control Intern

Tucson, AZ

June 2017 - August 2017

- Analyzed system performance through a variety of flight modes which pushed performance capabilities
- Identified CAS-induced roll buzz magnitude through FFT window sampling method
- Collaborated with engineers troubleshooting flight simulation and parameter modifications

Systems Engineering Intern

June 2016 - August 2016

- Developed system specifications tree and made modifications to existing design requirements
 - Created an automated tabulation tool in MATLAB for parts and processes
 - Created Simulink PID control for DC motor with encoder
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Research Experience

FACTS Lab

NSF Graduate Fellowship, Advisor: Dr. Samuel Coogan

Atlanta, GA

August 2018 - Present

- Core research competencies are controls, optimization, stochastic systems, and probability theory
- Developed analysis and control methods with applications to stochastic systems, robotics, and electric vehicle charging

Space Systems Design Lab

Graduate Research Assistant, Advisor: Dr. Marcus Holzinger

Atlanta, GA

August 2017 - June 2018

- Developed space object tracking software in C++ based on previously published literature
 - Developed Python sweeping tool for flight data analysis for situational awareness
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Publications

C. Santoyo, M. Dutreix, and S. Coogan. Verification and control for finite-time safety of stochastic systems via barrier functions. *IEEE Conference on Control Technology and Applications*, pp. 712–717, 2019

C. Santoyo, G. Nilsson, and S. Coogan. Multi-level electric vehicle charging facilities with limited resources. *IFAC World Congress*, 2020

M. Srinivasan, **C. Santoyo**, and S. Coogan. Continuous reachability task transition using control barrier function. *IFAC World Congress*, 2020

M. Dutreix, **C. Santoyo**, M. Abate, and S. Coogan. Interval-valued markov chain abstraction of stochastic systems using barrier functions. *American Control Conference (ACC)*, 2020

C. Santoyo, M. Dutreix, and S. Coogan. A barrier function approach to finite-time stochastic system verification and control. *in submission*, 2019

C. Santoyo, G. Nilsson, and S. Coogan. Resource-aware pricing for electric vehicle charging. *in submission*, 2020

Projects

Punctuation Prediction for Audio Speech Transcripts

Course: Deep Learning

- Developed and implemented long short term memory (LSTM), bi-directional LSTM (BLSTM), and gated recurrent unit (GRU) neural networks for automated punctuation of audio transcripts using PyTorch

Reinforcement Learning for Dynamical Systems

Course: Statistical Machine Learning

- Implemented reinforcement learning algorithm and compared performance with traditional model predictive control (MPC) methods using OpenAI Gym

Control Design for Planar Bi-Rotor Helicopter Stabilization

Course: Adaptive Control

- Designed and implemented an adaptive feedback controller which stabilizes a bi-rotor helicopter which is simulated using MATLAB

Leadership Experience

American Inst. of Aero. & Astro. - Univ. of FL. Chapt.

President (2015 - 2016), V.P. Internal (2014 - 2015)

Tau Beta Pi

Member (2015 - 2016)

Engineering Ambassadors

Social Chair (2015 - 2016), Ambassador (2014 - 2016)

Mechanical & Aerospace Engineering Peer Advisor

Peer Advisor (2015 - 2016)

Technical Skills

Programming Languages: C++, MATLAB, Python (PyTorch)

Operating Systems: Ubuntu, Windows, MacOS

Hardware: Arduino, Raspberry Pi, Turtlebot

Languages: English (native), Spanish (native), French (beginner)

Software: ROS, SolidWorks

Selected Coursework

Deep Learning, Statistical Machine Learning, Adv. Digital Signal Processing, Random Processes, Adaptive, Networked & Nonlinear Control

Awards

National Science Foundation Graduate Fellowship, Georgia Tech President's Fellowship

Teaching Experience

Summer Teacher Leadership Program (Ga. Tech), Summer Engineering Institute Instructor (Ga. Tech), Aerospace Structures Teaching Assistant (EAS4200C - Univ. of FL.)