Steven Nguyen

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Education

UC San Diego — San Diego, CA
PhD in Mechanical and Aerospace Engineering – GPA: 4.0/4.0 — Fall 2023 – Present
Specialization in data-driven control and model reduction.

UC Santa Barbara — Santa Barbara, CA
B.S. in Mechanical Engineering – GPA: 4.0/4.0 — September 2019 – June 2023

De Anza College – GPA: 4.0 — Cupertino, CA
Concurrent Enrollment while a student at Monta Vista High School — September 2018 – June 2019

Professional Experience

Graduate Researcher with Kramer Group and Cortes Group — La Jolla, CA
Advisors: Professors Boris Kramer and Jorge Cortes — Fall 2023 – Present
- Data-driven control for nonlinear systems……
- Data-driven control with model reduction for high-dimensional linear systems……..

Undergraduate Researcher in Nonlinear Dynamical Systems Lab — Santa Barbara, CA
Studying applications of Koopman Operator Theory — March 2022 – June 2023
- Tested varying input delay observables for data-driven modeling of soft arm.
- Studied implementation of model predictive control through LabView for soft arm.
- Studied stability and model accuracy of numerical approach to Carleman linearization via DMD.
- Implemented different EDMD algorithms and wrote one from scratch in MATLAB.
- Tested effectiveness of EDMD using varying amounts of monomial lifting functions

Research Intern at NSF REU: Smart Cities — Las Vegas, NV
Designed & implemented control for autonomous vehicles — June 2022 – August 2022
- Designed nested PID controllers for autonomous vehicle longitudinal/lateral motion.
- Incorporated position, velocity, yaw rate feedback to ensure stability, safety, and comfort.
- Implemented control in actual vehicle via drive-by-wire system and ROS.
- Demonstrated safe autonomous braking with vision-based detection of pedestrians in under 10 weeks.
- Applied filter to a free-space estimation model to track lane centers.
- Published in ICVES 2022 conference.

Intern at ATA Engineering — San Diego, CA
Assisted in structural analysis and internal research tools — June 2021 – September 2021
- Performed tolerance load analysis on rocket engine models using Femap and NX Nastran.
- Wrote MATLAB function to renumber Abaqus node/element IDs.
- Improved workflow by recording macros in STAR-CCM+ and Notepad++.
- Designed fixture plates for vibration test in SolidWorks and meshed in NX.
- Independently led internal research project to investigate automation for data transfer between SolidWorks and NX.
- Improved precision of macro for data translation between SolidWorks and NX and created geometric matching method.

Undergraduate Research Assistant in Interfacial Engineering Lab — Santa Barbara, CA

Design of surface science instrumentation January 2020 – December 2020

- Designed shape and dimensions of custom clamp to hold ultrasonicating horn inside sound enclosure.
- Fashioned the clamp using vertical band saw, end mill, and boring head.
- Machined acrylic sheets down to size to cover holes on glove box using drill press and end mill.
- Inspected measurements of engineering drawings of new tribometers to ensure they were consistent.
- Modeled and made engineering drawings for custom adapter stage to hold specimen for study through SolidWorks.

Publications

1. W. Heap, S. Man, V. Bassari, **S. Nguyen**, E. Yao, N. Tripathi, N. Naclerio, E. W. Hawkes. Large-scale Vine Robots for Industrial Inspection. *IEEE Robotics and Automation Magazine*, October 2024.
2. **S. Nguyen**, Z. Rahman, B. Morris. Pedestrian Emergency Braking in Ten Weeks. *IEEE International Conference on Vehicular Electronics and Safety*, November 2022.

Conference Presentations

1. **S. Nguyen**, B. Kramer, J. Cortes, "Data-Driven Control via Semidefinite Programming in Nonlinear Systems", *SIAM Conference on Computational Science and Engineering (CSE25)*, March 2025.

Educational Experience

Vine Robot for Industrial Pipe Inspection Capstone Project Santa Barbara, CA

Designed a novel vine robot platform for pipe inspection September 2022 – June 2023

- Developed novel model for vine robot buckling during operation to determine operating parameters.
- Created user interface using PyQT to control motors and fan during operation of robot.
- Demonstrated operation of vine robot on sample pipe system for Bechtel at their headquarters.
- Team won Best Technical award in capstone class.
- Published results of project in IEEE Robotics and Automation Magazine.

Rocket Propulsion Laboratory Injector Team Santa Barbara, CA

Designing fuel injector for bipropellant rocket September 2020 – June 2021

- Researched coaxial swirl injectors and read papers to learn about swirl design.
- Created complex geometries in SolidWorks with revolve, projected curve, and boundary features.
- Wrote MATLAB script to calculate effects of changes in geometry on spray characteristics.
- Created 3D surfaces, isosurfaces, and contour plots in MATLAB to optimize swirl injector geometry.
- Created function to find intersecting points between two isosurfaces in MATLAB.
- Simulated fluid flow and stress tests on designs using ANSYS Fluent/Mechanical.

Automatic Blind-Controller Santa Barbara, CA

Arduino class project May 2020

- Designed and constructed device that could turn window blinds based on light coming in window.
- Employed phototransistors to detect incoming light and added controls with potentiometer.
- Secured assembly on wooden beam by window for light detection and control of blinds.
- Nominated for best technical project in class.

Awards

- UCSD Powell Fellowship September 2023
- Graduated from UCSB with highest honors June 2023
- UCSB Dean's Honors Fall 2019 – Spring 2023
- Best Technical Capstone Project June 2023
- Tau Beta Pi Engineering Honor SocietyNovember 2021

Outreach Experience

Social Events Chair for RoboGrads San Diego, CA
Planned social outings for the RoboGrads student organization at UCSD October 2024 – Present

- Organized 9 hikes and 3 socials for the robotics research community at UCSD.

Math Tutor Cupertino, CA
Tutor January 2019 – June 2019

- Taught math to students ranging from middle school through high school.

Core Technical Skills

Programming:	Python, MATLAB, Yalmip, SOSTOOLS, CARLA, ROS, Tensorflow
CAD:	SolidWorks (CSWA cert.), Siemens NX
Analysis:	NX Nastran, Femap, Abaqus, STAR-CCM+, ANSYS Fluent, COMSOL
Operating Systems:	MacOS, Windows, Linux Ubuntu

Extracurriculars and Other Interests

Outside of research, I am a trombone player for La Jolla Symphony and Finest City Winds/Orchestra and Brass, and I'm a ringer for San Diego Youth Symphony. I also like to play Ultimate Frisbee around San Diego.