- Optimization
- Data Science
- Machine Learning

PROGRAMMING SKILLS

RESEARCH EXPERTISE

Python, Numpy/SciPy/Scikit-learn/Pandas/OpenAI/TensorFlow, CVX/Gurobi/Mosek, Jupyter Notebook/Google Colab, Matlab, Simulink, GridLabD, PyPower/pandapower, C & C++, HTML, Visual Basic, SQL, LaTeX

EDUCATION

Ph.D. Candidate in Electrical Engineering

University of California, Santa Barbara (UCSB)

- Thesis Title: Online Optimization & Learning for Sustainable Cyber-Human-Physical-Systems
- Advisor: Dr. Mahnoosh Alizadeh
- 2022: Electrical Engineering Department (UCSB) Dissertation Fellowship recipient (\$10,000)
- 2021: Electrical Engineering Department (UCSB) Graduate Student Spotlight Winter Quarter
- 2019: Institute for Energy Efficiency (UCSB IEE) Excellence in Research Fellowship recipient (\$22,500)
- 2019: Center for Control, Dynamical Systems, & Computation (UCSB CCDC) Winter Quarter Student Spotlight

M.S. in Electrical Engineering

Santa Clara University (SCU), With Thesis, GPA: 4.0

- Thesis Title: Jump Linear Quadratic Control for Energy Management of an Isolated Microgrid
- Advisor: Dr. Maryam Khanbaghi
- 2017: Outstanding Graduate Student/Researcher, Electrical Eng., Santa Clara University

B.S. in Computer Science, B.S. in Electrical Engineering

Santa Clara University (SCU), Summa Cum Laude, GPA: 3.89

- 2016: Outstanding Graduating Senior (GPA & department contribution), Electrical Eng., Santa Clara University
- 2016: Rank 1 in Graduating Class, Department of Electrical Engineering, Santa Clara University
- 2015-2016: Treasurer (2015) & President (2016) SCU IEEE Student Branch
- 2012-2016: Dean's List, School of Engineering, Santa Clara University

EXPERIENCE

Smart Infrastructure Systems Lab, UCSB

Graduate Student Researcher, Mentor, Project Lead

- (Research): Designed multiple online optimization, primal-dual, MPC frameworks for EV smart-charging [4],[7],[9],[10]
- (Research): Formulated and prototyped novel machine learning framework for demand response with safety constraints [3]
- (Research): Designed and prototyped an online auction mechanism for shared usage of an energy storage system [1]
- (Research): Formulated and analyzed a novel EV traffic/charging pattern equilibrium model in transportation networks [2]
- (Mentor): Mentored undergraduate EUREKA scholar Gil Sia (UCSB EUREKA Program) 2021-Current
- (Mentor): Mentored undergraduate EUREKA scholar Kelly Lin (UCSB EUREKA Program) 2020
- (Mentor): Mentored UCSB undergraduate Tuo Zhang (now a PhD student at USC) 2019
- (Project Lead): Managed Sebastian Cervantes, Alec Bronson Wheelan, and Andre Yousefian for their project Microgrid Test Bed (UCSB & U.S. Navy PIPELINES Program) 2021
- (Project Lead): Managed Juan Carillo and Emily Chapman for their project Pressure-Tolerant Circuit Board (UCSB & U.S. Navy PIPELINES Program, *2019 Design Competition Winners) 2019
- (Journal & Conference Reviewer): IEEE TSG, IEEE T-ITS, IEEE TIA, Elsevier: EPSR, IEEE CDC, IEEE ACC, IEEE PESGM, IEEE GlobalSip, IEEE ITSC, IEEE SmartGridComm, 2017-2022

SLAC National Accelerator Laboratory, GISMO Group, Stanford Researcher

- Designed, prototyped, and tested multiple EV smart-charging algorithms (Online Optimization, MPC) [5],[10]
- Formulated cost minimizing MILP for electric bus fleet route & charge scheduling (Stanford Marguerite Fleet) [6]

- Smart Grid Technologies and Renewable Energy Integration
- Electric Transportation Systems
- Urban Planning and Smart Cities

Sept 2017 - May 2022

Nathaniel Tucker

nathaniel_tucker@ucsb.edu https://nathanieltucker.github.io/

Expected

Sept 2012 - June 2016

Sept 2016 - June 2017

Sept 2017 - Current

Sept 2017 - Mar 2022

EXPERIENCE (CONTINUED)

Electrical Engineering Departments (UCSB & Santa Clara University)

Teaching Assistant & Lecturer

- Winter 2022: UCSB ECE 137A: Advanced Circuits & Electronics (Junior/Senior Level)
- Winter 2021: Designed and taught a course to local high school students in collaboration with UCSB's School for Scientific Thought (SST): The Global Energy Transition: Fossil Fuels to Renewable Energy.
- Spring 2018: UCSB ECE 10C: Circuits 3 (Freshman/Sophomore Level)
- Spring 2017: SCU ELEN 50: Circuits 1 (Freshman/Sophomore Level)
- Winter 2017: SCU ELEN 50: Circuits 1 (Freshman/Sophomore Level)
- Fall 2016: SCU ELEN 130: Control Theory (Junior/Senior Level)
- Fall 2016: SCU ELEN 50: Circuits 1 (Freshman/Sophomore Level)

Lockheed Martin Space Systems

Systems Engineering Intern, Littleton, CO & Sunnyvale, CA

- Designed procedure for testing contaminants' effects in rocket propulsion systems via infrared imaging
- Tested various satellite resistive heater designs for thermal profiling, analyzed power densities, and recommended design changes at connection points to reduce chance of device failure
- Conducted charging and electrostatic discharge testing of candidate thermal control materials for use on backside of satellite solar panel modules (Hardware: electron emitter, vacuum chamber, Software: LabView, Excel)
- Studied various radiation hardened circuit components' susceptibility to Single Event Effects (SEE) and proposed mitigation methods (LTSpice)

Cooper Environmental Services

Software Engineering Intern, Portland, OR

- Developed plug & play recalibration software for updating deployed air quality testing units (VB)
- Developed control software to manage on/off power for subsystems in air quality testing units (VB, Arduino)

PUBLICATIONS

[1] Journal: <u>N. Tucker</u>, M. Alizadeh, "An Online Scheduling Algorithm for a Community Energy Storage System", *IEEE Transactions on Smart Grid*, 2021, In Review.

[2] Journal: A. Moradipari, <u>N. Tucker</u>, M. Alizadeh, "Mobility-Aware Electric Vehicle Fast Charging Load Models with Geographical Price Variations", *IEEE Transactions on Intelligent Transportation Systems*, 2020, **Printed**.

[3] Journal: <u>N. Tucker</u>, A. Moradipari, M. Alizadeh, "Constrained Thompson Sampling for Real-Time Electricity Pricing with Grid Reliability Constraints", *IEEE Transactions on Smart Grid*, 2019, **Printed**.

[4] Journal: <u>N. Tucker</u>, M. Alizadeh, "An Online Admission Control Mechanism for Electric Vehicles at Public Parking Infrastructures", *IEEE Transactions on Smart Grid*, 2019, **Printed**.

[5] **Conference:** <u>N. Tucker</u>, G. Cezar, M. Alizadeh, "Real-Time Electric Vehicle Smart Charging at Workplaces: A Real-World Case Study", *IEEE PESGM*, 2022, **To Appear**.

[6] **Conference:** A. Moradipari, **N. Tucker**, T. Zhang, G. Cezar, M. Alizadeh, "Mobility-Aware Smart Charging of Electric Bus Fleets", *IEEE PESGM*, 2020, **Printed**.

[7] **Conference:** <u>N. Tucker</u>, B. Turan, M. Alizadeh, "Online Charge Scheduling for Electric Vehicles in Autonomous Mobility on Demand Fleets", *Intelligent Transportation Systems Conference (ITSC)*, 2019, **Printed**.

[8] **Conference:** B. Turan, <u>N. Tucker</u>, M. Alizadeh, "Smart Charging Benefits in Autonomous Mobility on Demand Systems", Intelligent Transportation Systems Conference (ITSC), 2019, **Printed**.

[9] Conference: <u>N. Tucker</u>, B. Ferguson, M. Alizadeh, "An Online Pricing Mechanism for Electric Vehicle Parking Assignment and Charge Scheduling", *IEEE American Control Conference (ACC)*, 2019, **Printed**.

[10] Conference: <u>N. Tucker</u>, M. Alizadeh, "Online Pricing Mechanisms for Electric Vehicle Management at Workplace Charging Facilities", Allerton Conference on Comm., Control, and Computing, 2018, **Printed**.

[11] Conference: <u>N. Tucker</u>, M. Khanbaghi, "Jump Linear Quadratic Control for Energy Management of a Nanogrid", *IEEE American Control Conference (ACC)*, 2018, **Printed**.

Sept 2016 - Mar 2022

Summer 2015 & Summer 2016

Summer 2014