Liliaokeawawa Cothren

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Research Interests

Optimization theory, control and nonlinear systems theory, machine learning.

Education

University of Colorado Boulder — Boulder, Colorado
Ph.D. in Electrical Engineering — May 2021 – Present
Advisor: Professor Emiliano Dall'Anese. *GPA: 3.95.*

Arizona State University — Tempe, Arizona
B.S. in Mathematics, with Honors — August 2017 – May 2021
GPA: 3.96.

Honors and Scholarships

NSF Graduate Research Fellowship Program (GRFP)	2023 – Present
Dean's Future Leadership Fellowship (CU Boulder)	2021
ECEE Excellence Fellowship (CU Boulder)	2021
Graduate School Diversity Fellowship (CU Boulder)	2021
Dean's List (ASU)	2017 – 2021
Outstanding Junior for Wexler Students (ASU)	2020

Publications

Journal papers

J 1. L. Cothren, G. Bianchin, E. Dall'Anese, "Online Optimization of Dynamical Systems with Deep Learning Perception," *IEEE Open Journal of Control Systems*, accepted September 2022.

Conference papers (published/to appear)

C 1. L. Cothren, G. Bianchin, E. Dall'Anese, "Data-enabled Gradient Flow as Feedback Controller: Regulation of Linear Dynamical Systems to Minimizers of Unknown Functions," 4^{th} *Annual Learning for Dynamics & Control Conference*, June 2022.

C 2. L. Cothren, A. Ospina, G. Bianchin, E. Dall'Anese, "Perception-based Online Optimization of Linear Time-Invariant Dynamical Systems," *2022 Asilomar Conference on Signals, Systems, and Computers*, accepted November 2022.

C 3. L. Cothren, G. Bianchin, S. Dean, E. Dall'Anese, "Perception-based Sampled-data Optimization of Dynamical Systems," 22^{nd} *Annual World Congress of the International Federation of Automatic Control*, submitted October 2022, to appear July 2023.

Research Experience

Graduate Research Assistant for the Dall'Anese Group

Advisor: Professor Emiliano Dall'Anese (CU Boulder) May 2021 – Present

Build core background in optimization and control theory to specifically tackle problems within data-driven control and concurrent learning via theoretical and algorithmic developments. Verify theoretical findings with numerical simulations in MATLAB or Python. For recent work, please see here.

Undergraduate Honors Thesis on the Convergence to Optimal Rate due to Simple Heuristic

Advisor: Professor Theodore Pavlic (ASU) August 2019 – May 2021

Submitted to The Barrett, Honors College Thesis Library and Digital Repository. Numerically simulate stochastic system via time synchronous clock and discrete-event-triggered codes. Formalize rigorous analysis proof that a simple decision-making heuristic guarantees optimal convergence onto a maximal caloric state of forager.

Teaching Experience

Learning assistant, Department of Electrical Engineering (CU Boulder)

ECEN 3300: Linear Systems Spring 2022, Spring 2023

Topics include analysis of LTI systems in time and frequency domains and applications of linear systems, including communications, signal processing, and controls. Responsible for scripting and delivering regular review sessions, exam review sessions, and grading homework and exams.

Teaching assistant, Department of Industrial Engineering (ASU)

IEE 380: Probability and Statistics for Engineers Spring 2019 – Spring 2020

Topics include discrete and continous random variables and probability (mass or) density functions, hypothesis testing of means, variances, and proportions, and applications for engineering problems. Responsible for scripting and delivering regular homework review sessions, exam review sessions, and proctoring exams.

Teaching assistant, Department of Industrial Engineering (ASU)
FSE 100: Introduction to Engineering Fall 2018
Topics include preliminary material to prepare students for an engineering mentality through a hands-on project focused on programming a robot to navigate a maze. Responsible for organizing materials and answering project questions.

Industry Experience

ASU Fulton Schools of Engineering Tutoring Centers Tempe, Arizona
Lead tutor for mathematics and industrial engineering Fall 2019 – Spring 2021
Instruct and assist in answering questions related to industrial engineering, probability, statistics, calculus, linear algebra, ordinary differential equations, and real analysis. Write training curricula for tutors, including technical review sessions of frequent coursework and training on how to effectively tutor a variety of learning styles.

United Parcel Service (UPS) Phoenix, Arizona
Industrial Engineering Intern Summer 2019
Collaborate on a multi-disciplinary team to plan for Peak season, including discussions with managers, plant engineers, and industrial engineers to draft accurate building layout and plot plans for 90 facilities. Presented recommendations in weekly updates, with success in redrafting some facilities' layouts for improved safety and efficiency.

Skills

Programming
Proficient in: MATLAB.
Familiar with: Python, Java.

Outreach

Graduate Peer Mentor 2022 – Present
Mentor

American Heart Association: STEM Goes Red Mentor 2022
Mentor

Centennial High School STEM Panel 2018 – 2022
Yearly Panel Guest

Fulton Ambassadors January 2018 – May 2020
Member

Engineering Summer Camp (E2) August 2018, August 2019
Counselor

Engineering Projects in Community Service August – December 2018
Member

Professional Memberships

Dean's Future Leaders Fellowship August 2021 – Present
Fellow

Association for Women in Mathematics August 2019 – May 2021
Member

Society for Women Engineers August 2019 – May 2020
Member