LILIAOKEAWAWA (LILY) COTHREN

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RESEARCH INTERESTS

Nonlinear systems theory, control theory, online optimization, network systems.

EDUCATION

University of Colorado Boulder *May 2021 – Present*
Ph.D. in Electrical Engineering GPA: 3.95

University of Colorado Boulder *August 2021 – May 2021*
M.S. in Electrical Engineering GPA: 3.95

Arizona State University *August 2017 – May 2021*
B.S. in Mathematics GPA: 3.96

RESEARCH EXPERIENCE

Graduate Research Assistant, 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.

Undergraduate Research Assistant, ASU *August 2019 – May 2021*
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.

PUBLICATIONS

Under Review:

J 1. L. Cothren, F. Bullo, E. Dall'Anese, "Singular Perturbation via Contraction Theory," *IEEE Transactions on Automatic Control*, submitted October 2023, under review.

C 1. Y. Chen, L. Cothren, J. Cortes, E. Dall'Anese, "Online Regulation of Dynamical Systems to Solutions of Constrained Optimization Problems," *IEEE Control System Letters*, submitted September 2023, under review.

Published/To Appear:

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.

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 and 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.

DISTINCTIONS

NSF Graduate Research Fellowship Program (GRFP), NSF *Sept. 2023 – Sept. 2026*

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*

SKILLS

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

TEACHING EXPERIENCE

Learning Assistant, CU Boulder *Fall 2023*
ECEN 5478: Online Convex Optimization
Topics include basics of convex optimization and contraction theory. Responsible for hosting office hours, providing guidance on course projects, and grading homework and exams.

Learning Assistant, CU Boulder *Spring 2022, Spring 2023*
ECEN 3300: Linear Systems
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.

Undergraduate Teaching Assistant, ASU *Spring 2019 – Spring 2020*
IEE 380: Probability and Statistics for Engineers
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.

Undergraduate Teaching Assistant, ASU *Fall 2018*
FSE 100: Introduction to Engineering
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.

WORK EXPERIENCE

Lead Tutor for Mathematics and Industrial Engineering, ASU *Fall 2019 – Spring 2021*
ASU Fulton Schools of Engineering Tutoring Centers
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.

Industrial Engineering Intern, United Parcel Service (UPS) *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.

SERVICE AND ORGANIZATIONS

Graduate Peer Mentor, CU Boulder Graduate School *2022 – Present*

STEM Goes Red Mentor, American Heart Association *September 2022*

STEM Panelist, Centennial High School *2018 – 2022*

Dean's Future Leaders Fellow, CU Boulder *2021 – 2022*

Member, ASU Association for Women in Mathematics *August 2019 – May 2021*

Member, ASU Society for Women Engineers *August 2019 – May 2020*

Fulton Ambassador, ASU *January 2018 – May 2020*

Engineering Summer Camp Counselor, ASU *August 2018, August 2019*

Engineering Projects in Community Service, ASU *August – December 2018*

SELECT COURSEWORK

Geometric Control Theory at CU Boulder *Fall 2022*

Theory of Nonlinear Systems at CU Boulder	*Spring 2022*
Control Systems Analysis at CU Boulder	*Spring 2022*
Theory of Machine Learning at CU Boulder	*Spring 2022*
Online Convex Optimization at CU Boulder	*Fall 2021*
Advanced Linear Systems at CU Boulder	*Fall 2021*
Applied Linear Algebra at ASU	*Fall 2020*
Differential Equations I at ASU	*Fall 2020*
Network Optimization and Algorithms at ASU	*Spring 2020*