
CARY LAIRD

Graduate Research Assistant, Alleyne Research Group
Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign
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EDUCATION

Ph.D. Mechanical Engineering

University of Illinois at Urbana-Champaign *Expected graduation: May 2023*
Adviser: Prof. Andrew Alleyne

M.S. Mechanical Engineering

University of Illinois at Urbana-Champaign *May 2021*
Adviser: Prof. Andrew Alleyne

B.S. Mechanical Engineering

Auburn University *May 2018*
GPA: 4.0
Honors Scholar

B.S. Physics

Auburn University *May 2018*

RESEARCH EXPERIENCE

Graduate Research Assistant, Alleyne Research Group

University of Illinois at Urbana-Champaign *August 2018 – Present*

- Development and evaluation of control-oriented models of energy storage devices
- Model predictive control and design optimization of electro-thermal systems

Undergraduate Researcher

Auburn University Dept. of Mechanical Engineering *January 2017 – May 2018*

- Design, drafting, and assembly of machine parts for powder-based additive manufacturing device

Auburn University Dept. of Physics *January 2016 – January 2017*

- Designed and 3D-printed prototypes to study chaotic phenomena in wind instruments

HONORS AND AWARDS

- Dean's Medalist in Physics, Auburn University, 2018
- Dean's Award for Academic Excellence, Auburn University, 2018
- O'Neal Austin Best Student Awards: System Dynamics and Controls, Fluid Mechanics, Mechanics of Materials, Auburn University, 2016-2017
- Dean's List, Auburn University, 2014-2018
- Honor Society Inductions: Tau Beta Pi (2016), Pi Tau Sigma (2016), Sigma Pi Sigma (2017), Phi Kappa Phi (2017)

PUBLICATIONS AND PRESENTATIONS

Conference

1. **C. Laird**, D. Docimo, C.T. Aksland, A.G. Alleyne, "Graph-Based Design and Control Optimization of a Hybrid Electrical Energy Storage System," in *ASME Dynamic Systems and Control Conf.*, 2020. (Technical paper and presentation)
2. H.C. Pangborn, **C. Laird**, and A.G. Alleyne, "Hierarchical Hybrid MPC for Management of Distributed Phase Change Thermal Energy Storage Under Pulsed Loading," *Proc. of the 2020 American Control Conference*, July 2020.

3. **C. Laird** and A.G. Alleyne, “A Hybrid Electro-Thermal Energy Storage System for High Ramp Rate Power Applications,” *ASME Dynamic Systems and Control Conf.*, 2019. (Technical paper and presentation)

Thesis

- C. Laird, “Modeling, Control, and Design of Hybrid Electrical and Thermal Energy Storage Systems,” MS Thesis, University of Illinois at Urbana-Champaign, 2021.

Presentations

1. “Design and Control Optimization of Hybrid Thermal Energy Storage System,” Center for Power Optimization of Electro-Thermal Systems Annual Meeting Poster Session, October 2020.
2. “Graph-Based Design Optimization of Hybrid Energy Storage Systems,” Center for Power Optimization of Electro-Thermal Systems SLC Technical Conference, May 2020.
3. “Modeling and Control of Electro-Thermal Hybrid Energy Storage Systems,” Center for Power Optimization of Electro-Thermal Systems Annual Meeting Poster Session, October 2019.
4. Summer Internship Presentation, MIT Lincoln Laboratory, August 2018.
5. Summer Internship Presentation, Southern Nuclear Operating Co., August 2016.

LEADERSHIP

Future Technical Leaders Fellow

Center for Power Optimization of Electro-Thermal Systems *September 2021 – April 2022*

Student Leadership Council – President

Center for Power Optimization of Electro-Thermal Systems *August 2020 – July 2021*

- Planned and oversaw SLC meetings and activities

Student Leadership Council – IT and Webinar Coordinator

Center for Power Optimization of Electro-Thermal Systems *August 2019 – July 2020*

- Managed and updated center website, including weekly webinar content

Piccolo Section Leader

Auburn University Marching Band *August 2016 – January 2018*

- Led a section of 31 piccolo players in daily warmups and stretches, weekly sectional rehearsals, and weekly gameday activities

Member Relations Officer

ASME, Auburn Student Chapter *August 2016 – August 2017*

- Organized student events, such as industry presentations and chapter meetings

Public Relations Committee Member

Engineers Without Borders, Auburn Student Chapter *August 2016 – January 2017*

- Coordinated fundraising events and grant searches

SCHOLARSHIPS AND FELLOWSHIPS

University of Illinois at Urbana-Champaign

- SURGE Fellowship *2018*

Auburn University

- Tau Beta Pi Campbell Scholarship *2017*
- Alabama Space Grant Consortium Scholarship *2017*
- Florida Dept. of Transportation SASHTO Scholarship *2014, 2016*
- Carol C. Laster Band Scholarship *2014*
- Auburn University Academic Heritage Scholarship *2014*

TEACHING EXPERIENCE

Fluid Mechanics Peer Tutor

Auburn University Dept. of Mechanical Engineering

August 2017 – May 2018

- Led weekly lecture-style group tutoring sessions for approx. 20 undergraduate students

Calculus and Physics Peer Tutor

Auburn University Study Partners

February 2016 – May 2017

- Held one-on-one and group tutoring sessions for students studying physics and calculus

WORK EXPERIENCE

Engineering Intern

Massachusetts Institute of Technology Lincoln Laboratory

May 2018 – August 2018

- Developed and simulated algorithms for tracking dim targets in optical images

Engineering Intern

Farley Nuclear Plant

May 2016 – August 2016

- Coordinated completion and submittal of industry-relevant reports