

Julia Costacurta

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EDUCATION

Stanford University

Palo Alto, CA, Sept 2020 - Present

M.S. and Ph.D., Electrical Engineering

Cum. GPA: 4.04

Advisor: Scott Linderman

Funding Sources:

- NSF Graduate Research Fellowship
- Sang Samuel Wang Stanford Graduate Fellowship
- Enhancing Diversity in Graduate Education (EDGE) Fellowship

Johns Hopkins University

Baltimore, MD, May 2020

B.S., Biomedical Engineering, Mathematics, Applied Mathematics and Statistics

Cum. GPA: 3.95

Honors and Awards:

- Goldwater Scholarship: \$7500 award for biomedical undergraduate research
- Richard J. Johns Award for Outstanding Academic Achievement: Biomedical Engineering
- Departmental Honors: Biomedical Engineering, Applied Mathematics and Statistics

RESEARCH EXPERIENCE

Stanford Linderman Lab

Stanford, CA

Graduate Research, Advisor: Dr. Scott Linderman

April 2021 – Present

- Work with a fellow PhD student to improve MoSeq, an unsupervised data analysis tool built using autoregressive hidden Markov models (ARHMMs), which segments videos of mouse behavior into identifiable and repeated movement patterns. Derive and implement training algorithms for “time-warped” ARHMMs, in which similar actions are grouped together based on shared action vigor/speed.

JHU Neuromedical Control Systems Lab

Baltimore, MD

Undergraduate Research, Advisor: Dr. Sridevi Sarma

September 2017 – May 2020

- Awarded \$3000 fellowship to study development of system of controllers to provide upper-limb prosthesis users with a more natural method of device operation and sensory feedback. Applied optimal control techniques to write code that tunes controllers using error minimization in MATLAB.

Fields Institute for Research in the Mathematical Sciences

Toronto, ON

Undergraduate Research, Advisors: Drs. Adam Stinchcombe & Mihai Nica

Summer 2019

- Collaborated with two other undergraduates to design and implement Python machine learning code which approximates numerical solutions to partial differential equations, using probability theory.

JHU Center for Educational Resources (CER)

Baltimore, MD

CER Tech Fellows Project, Advisor: Dr. Sridevi Sarma

September 2018 – May 2019

- Won \$4000 fellowship to create educational resources for JHU students. Developed online, interactive applet using R to demonstrate biological applications of control theory. Implemented applet in the course “Systems and Controls,” a 120-person undergraduate engineering course.

University of Washington Ability and Innovation Lab

Seattle, WA

REU Undergraduate Research, Advisor: Dr. Katherine Steele

Summer 2018

- Earned \$5000 NSF Research Experience for Undergraduates (REU) summer grant to study ankle-foot orthoses. Created MATLAB data-processing pipeline to investigate effects of ankle-foot orthosis properties on gait characteristics during transient, or non-steady-state, walking in healthy adults.

TEACHING & WORK EXPERIENCE

Stanford Engineering: Equity and Inclusion Initiatives

Palo Alto, CA

Course Assistant, Additional Calculus for Engineers (ACE)

September 2021 – Present

- Host weekly drop-in support hours for students enrolled in undergraduate mathematics courses.
 - Ordinary Differential Equations for Engineers (CME 102, Fall 2021)

Program Coordinator, Summer Undergraduate Research Fellowship February 2021 – August 2021

- Organized professional and social events, managed communications, and served as an application reviewer for SURF, a summer research program aimed at demystifying research and the graduate application process for students from underrepresented backgrounds.

Stanford Adventure Programs

Palo Alto, CA

Climbing Wall Floor Supervisor

September 2021 – Present

- Oversee climbers, welcome guests, and promote a safe and welcoming environment at the Stanford Climbing Wall.

Bridge to Enter Advanced Mathematics (BEAM)

Counselor and TA, BEAM Summer Away

July 2020

- Served as a counselor and TA for approximately 40 eighth graders in a four-week online summer program, aimed at teaching love of math to students from underserved groups.

Johns Hopkins University

Baltimore, MD

Teaching Assistant

Fall 2018 – May 2020

- Prepared weekly lecture for 30-person section, graded homework and exams, held office hours, and led review sessions for undergraduate courses in depts of Mathematics and Biomedical Engineering.
 - Differential Equations (Fall 2018, Spring 2019, Spring 2020): 200-person ordinary differential equations course; Systems and Controls (Spring 2019 & 2020): 120-person biomedical eng. control theory course; Calculus III (Fall 2019): 350-person vector calculus course.
- Earned awards for teaching from both departments: Professor Joel Dean Excellence in Teaching Award for Undergraduates (Mathematics), David T. Yue Memorial Teaching Award (Biomedical Engineering)

JHU Jail Tutorial Project

Jessup, MD

Volunteer Tutor

September 2017 – May 2020

- Instructed inmates at Jessup Women's Correctional Institution on mathematics topics for the GED.

SELECTED PUBLICATIONS, CONFERENCE PRESENTATIONS, AND SEMINARS

Costacurta, J., Osborn, L., Thakor, N. V., & Sarma, S.V. Designing Feedback Controllers for Human-Prosthetic Systems Using H-Infinity Model Matching. Conference Paper published in 2018 International Conference of the IEEE Engineering in Medicine and Biology Society.

Costacurta, J., Lee, J.M., Sczerba, R., & Sarma, S.V. An Interactive Applet for Teaching Biomedical Applications of Feedback Control Theory. Abstract accepted to 2019 Biomedical Engineering Society (BMES) Conference.

Rosenberg, M.C., Eyre, M., **Costacurta, J.**, Peters, K.M., & Steele, K.M. Kinematic and myoelectric response to ankle exoskeletons during non-steady state locomotion in healthy adults. Abstract accepted to 2019 Congress of the International Society of Biomechanics.

Martin, C., Zhang, H., **Costacurta, J.**, Nica, M., and Stinchcombe, A., "Solving Elliptic Equations with Brownian Motion: Bias reduction and Temporal Difference Learning," published in Methodology and Computing in Applied Probability (2021).