Julia Costacurta

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EDUCATION

Stanford University Palo Alto, CA, Sept 2020 - Present

M.S. and Ph.D., Electrical Engineering Cum. GPA: 4.02

Advisor: Scott Linderman

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

Other Recognitions:
- Mind, Brain, Computation, and Technology Student Membership, Wu Tsai Neurosciences Institute
- School of Engineering Justice, Equity, Diversity, and Inclusion (JEDI) Travel Grant

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
- 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 *March 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 in Python for “time-warped” ARHMMs, in which similar actions are grouped together based on shared action vigor/speed.
- Presented as a poster and waitlisted for oral presentation at COSYNE 2022.

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.

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.

SELECTED PUBLICATIONS & CONFERENCE PRESENTATIONS

Costacurta, J., Duncker, L., Sheffer, B., Weinreb, C., Gillis, W., Markowitz, J., Datta, S.R., Williams, A., & Linderman, S.W. Distinguishing discrete and continuous behavioral variability using warped autoregressive HMMs. bioRxiv, 2022.

Costacurta, J., Williams, A., Sheffer, B., Weinreb, C., Gillis, W., Markowitz, J., Datta, S.R., & Linderman, S.W. Time-warped state space models for distinguishing movement type and vigor. Poster presented at 2022 Computational and Systems Neuroscience (COSYNE) Conference. Waitlisted for talk.

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.

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).

TEACHING & WORK EXPERIENCE

Center for Teaching and Learning Palo Alto, CA

Engineering Learning Consultant *September 2022 – Present*

- Develop and present academic skills programming for students in the School of Engineering.
- Create content to support Equity and Inclusion Initiatives summer programs.

Stanford Engineering: Equity and Inclusion Initiatives Palo Alto, CA

Course Assistant, Additional Calculus for Engineers (ACE) *Fall 2021*

- Hosted weekly drop-in support hours for students enrolled in undergraduate mathematics courses, with the goal of making collegiate math courses more accessible.
  - 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.

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.