

Julia Costacurta

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EDUCATION

Johns Hopkins University

Baltimore, MD, expected 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, Tau Beta Pi: National Engineering Honor Society

RESEARCH EXPERIENCE

JHU Neuromedical Control Systems Lab

Baltimore, MD

Undergraduate Research, Advisor: Dr. Sridevi Sarma

September 2017 – Present

- 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

July 2019 – August 2019

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

JHU Center for Bioengineering Innovation and Design (CBID)

Baltimore, MD

Global Health Design Team, Advisor: Dr. Elizabeth Logsdon

April 2018 – May 2019

- Worked with team of fellow undergraduates to design a low-cost device that deskills the breast biopsy procedure, so that untrained providers in remote clinics in South Africa can perform the procedure, and more rural women can be tested for breast cancer.

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

June 2018 – August 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.

JHU Directed Reading Program (DRP)

Baltimore, MD

Undergraduate Independent Study, Advisor: Dr. Richard Brown

February 2018 – May 2018

- Completed independent study project on mathematical control theory with guidance from a PhD student. Read an advanced mathematical text, solved problems, and gave a final oral presentation.

JHU Neuroengineering and Biomedical Instrumentation Lab

Baltimore, MD

Undergraduate Research, Advisor: Dr. Nitish Thakor

March 2017 – August 2017

- Designed and coded a device that gives temperature-based feedback to upper-limb prosthesis users using Arduino and MATLAB.

TEACHING EXPERIENCE

Johns Hopkins University

Baltimore, MD

Teaching Assistant

Fall 2018 – Present

- Prepared weekly lecture for 30-person section, graded homework and exams, held office hours, and led review sessions for undergraduate courses.
 - Differential Equations (Fall 2018 & Spring 2019), 200-person ordinary differential equations course.
 - Systems and Controls (Spring 2019), 120-person biomedical engineering control theory course.
 - Calculus III (Fall 2019), 350-person vector calculus course.

JHU Jail Tutorial Project

Jessup, MD

Volunteer Tutor

September 2017 – Present

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

Art of Problem Solving

Course Assistant

May 2017 – December 2018

- Answered questions and assisted with teaching prealgebra topics to a class of approximately 50 middle school students in a live online classroom setting.

LEADERSHIP EXPERIENCE

Homewood Chamber Music Seminar

Baltimore, MD

Co-President, Violinist

September 2018 – Present

- Coordinated group of 20+ musicians by organizing auditions, scheduling coaching times with Baltimore Symphony professionals, and promoting concerts.

JHU Ex Numera (Mathematics Club)

Baltimore, MD

Social Chair

September 2019 – Present

- Created new undergraduate-focused speaker series, aimed at exposing people of different mathematical backgrounds to careers and experiences in mathematics.

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.

Stinchcombe, A., Nica, M., **Costacurta, J.**, Martin, C., and Zhang, H., "Temporal Difference Learning for PDEs," in preparation.

Seminar Participation:

2019 Institute for Advanced Study Program for Women and Mathematics

Princeton, NJ

2018 Graduate Research Opportunities for Women Conference

Ann Arbor, MI

TECHNICAL SKILLS AND INTERESTS

- Proficient in **MATLAB** and **LaTeX**. Experience in **Python** and **R**.
- Interests: reading and writing fiction, gardening, period dramas, cooking.