Laila C. Johnston

Curriculum Vitae

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Education

2018 – 2023 University of Central Florida (UCF) | Orlando, FL
Bachelor of Science (B.S.) in Mathematics
Minor in Computer Science, Minor in Philosophy

Research Experience

2021 – present **Visiting Student**, Department of Brain and Cognitive Sciences, *CoCoSci Group*, Massachusetts Institute of Technology
Advisors & Mentors: Dr. Joshua B. Tenenbaum, Dr. Tobias Gerstenberg, Dr. Max H. Siegel
- Investigating how to build models that capture the compositional and probabilistic nature of concepts, and how these models can form and reason with novel concepts
- Learning and using WEBPPL to build probabilistic programs

Summer 2021 **Research Fellow**, MSRP Bio/Neuro, Center for Brains, Minds, and Machines, *Computational Cognitive Neuroscience Lab*, Harvard University
Advisor: Dr. Samuel J. Gershman
- Researched how to create models of human visual working memory
- Investigated visual working memory in the domain of human faces
- Learned and used SCALA to generate faces using the Basel Face Model
- Designed a change-detection experiment, collected the data, and analyzed the results

2020 – 2021 **Researcher**, Carnegie Mellon University
Advisor: Dr. David Danks
- Continued summer research on individual differences in causal learning
- Modified existing data and results
- Wrote and submitted a research paper to the 43rd Annal Conference of the Cognitive Science Society
- Read paper reviews and edited paper accordingly

Summer 2020 **Research Fellow**, Undergraduate Program in Neural Computation, *Center for the Neural Basis of Cognition*, Carnegie Mellon University
Advisor: Dr. David Danks
- Investigated how certain causal learning models could best describe the ways individuals make causal inferences and individual differences in causal learning patterns
- Collaborated on developing previously known causal learning models as computational models
- Created seven novel causal learning models
- Developed code in PYTHON to find and analyze causal learning models of best fit for a set of experimental data

2019 – 2020 **Undergraduate Research Assistant**, *Laboratory for Autonomy-Brain Exchange (LabX)*, University of Central Florida
Advisor: Dr. Ben D. Sawyer
- Assisted in conducting a driving simulation experiment by ensuring informed consent from participants, explaining the procedures of the experiment, and recording data
- Learned the foundations of coding an artificial neural network

- Explored representing and extending the O-Ring Theory of Economic Development as a computational simulation

Publications

Johnston, L.*, Hillman, N.*, Danks, D. (2021). Individual Differences in Causal Learning. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*.

Presentations

Johnston, L.C., Siegel, M.H., Gerstenberg, T., Tenenbaum, J.B. (2021, September). Reasoning with Compositional Concepts. *MKN McNair Heartland Research Conference*. Oral presentation (15 minutes).

Johnston, L.C., Bates, C.J., Egger, B., Gershman, S.J. (2021, August). Scaling Models of Visual Working Memory to Natural Images: A Case Study in Human Faces. *Center for Brains, Minds, and Machines Summer Research Poster Session*. Poster presentation.

Johnston, L., Hillman, N., Danks, D. (2021, March). Individual Variation in Causal Learning. *UCF Student Scholar Symposium*. Poster presentation.

Johnston, L., Hillman, N., Danks, D. (2020, August). Individual Variation in Causal Learning. *Center for the Neural Basis of Cognition Undergraduate Summer Research Showcase*. Poster presentation.

Awards and Honors

2021 – 2022 **Visiting Student Fellowship**, Department of Brain and Cognitive Sciences, MIT
2021 **Hispanic Heritage Scholarship Fund of Metro Orlando Scholar**
Summer 2021 **Massachusetts Institute of Technology Summer Research Fellow** (NSF Funded)
Summer 2021 **McNair Summer Research Institute Scholarship**
2020 **Ronald E. McNair Scholar**
2020 **Carolyn Euliano Endowed Scholarship in Mathematics**, University of Central Florida
Summer 2020 **Carnegie Mellon University Summer Research Fellow** (NIH Funded)
2018 – 2020 **Dean's List** (4 Semesters), University of Central Florida
2018 **EXCEL Scholar**, University of Central Florida
2018 **Pegasus Scholar**, University of Central Florida
2018 **Florida's Bright Futures Academic Scholar**
2018 **International Baccalaureate Diploma Recipient**

Teaching and Mentorship

Jan. 2022 **Teaching Assistant & Mentor**, *Quantitative Methods Workshop*, MIT
Supervisor: Dr. Mandana Sassanfar
- Invited to help 80 undergraduate students understand how to solve common problems in biology and neuroscience through writing programs in PYTHON
- Spoke to undergraduate students about summer research programs and shared my experiences being a Visiting Student at MIT
- Reviewed statements of purpose, CVs, and other application materials for summer research programs

2020 **Undergraduate *EXCEL* Tutor**, University of Central Florida
Supervisor: Sarah Evans
- Aided students in UCF's *EXCEL Program* in math and computer science topics
- Guided and supported students on their current and future academic careers

Leadership

2020 – present ***Cognitive Sciences Club***, University of Central Florida
Advisor: Dr. Luis Favela
President (Dec. 2020 – present)
- Schedule and supervise meetings, faculty and graduate student panels, and social events for the club
- Delegate responsibilities to executive team

Secretary (July 2020 – Dec. 2020)
- Documented club meetings, discussions, and club attendance
- Updated members through weekly emails about meetings, events, and opportunities for research and conferences in cognitive science

2020 – present ***Artificial Intelligence Club***, University of Central Florida
Vice President (April 2021 – present)
- Oversee decisions, activities, event planning and scheduling of club events
- Coordinating a project collaboration with the Institute of Electrical and Electronics Engineers (IEEE) on creating a robot arm that can play chess using machine learning techniques

Coordinator (Feb. 2021 – April 2021)
- Co-planned meetings through discussing topic ideas and attended presentation rehearsals
- Answered questions on coursework, scheduling, and professional development opportunities

2018 – present **Member**, ***Outlanders Club***, University of Central Florida
- Participate in outdoor activities such as hiking, camping, and kayaking
- Spread awareness of the importance of protecting the planet and spending time in nature

2019 – 2020 **Secretary**, ***Collegiate Mathematical Society***, University of Central Florida
- Organized workshops, presentations, and events related to topics in mathematics
- Documented club meetings, discussions, and attendance
- Promoted the club by making flyers, sending emails, and tabling at expos

Talks, Workshops, and Conferences

Oct. 2021 **Attendee**, *Princeton Prospective Ph.D. Preview (P3) Conference*, Princeton University
- Accepted to attend workshops on the important elements of research, the graduate school application process, CV and resume writing, and professional development
- Networked with graduate students and learned about life at Princeton
- Visited the psychology, neuroscience, and computer science departments

Oct. 2021 **Undergraduate Research Student Panelist**, *The Undergraduate Research Committee*, San Diego State University
- Shared my experiences in undergraduate research
- Spoke about why research is important and why others should get involved in research
- Gave advice on how to apply and prepare for an undergraduate research experience

Jan. 2021 **Attendee**, *Quantitative Methods Workshop*, Massachusetts Institute of Technology
Director: Dr. Mandana Sassanfar
- Networked with undergraduate students, graduate students, and professors
- Attended MATLAB workshops on machine learning, neural spike analysis, analyzing fMRI data using the General Linear Model, and calcium imaging data analysis
- Learned about and coded different data science techniques such as the k-means algorithm, support vector machine algorithm, peri/post-stimulus time histogram (PSTH), and z-scoring
- Attended lectures on quantifying genetic variants, computer vision, functional imaging of the human brain, and convolutional neural networks

Oct. 2020 **Summer Research Student Panelist**, *The Office of Academic Advancement Programs*, University of Central Florida
- Shared experiences from Carnegie Mellon University's summer Undergraduate Program in Neural Computation
- Advised prospective applicants on preparing for summer research programs
- Discussed the advantages and disadvantages of doing research virtually

Jan. 2019 **Attendee**, *Joint Mathematics Meetings*, Baltimore, MD
- Attended this conference as part of the *Collegiate Mathematical Society* at UCF
- Networked with professors, post-docs, and graduate and undergraduate students
- Learned about mathematical origami and created a stellated octahedron
- Attended lectures on graph theory, differential geometry, coding theory, and topology

Skills

Programming	PYTHON, WEBPPL, R, JAVA, C
Certifications	CITI Program Human Subjects Research

Relevant Coursework

Mathematics	Calculus I – III, Ordinary Differential Equations I, Logic and Proof in Mathematics, Linear Algebra, Mathematical Foundations of Machine Learning and Artificial Intelligence, Probability Random Processes and Applications, Advanced Calculus I, Introduction to Topology, Introduction to Graph Theory*, Mathematical Modeling I*, Abstract Algebra I*
Comp Sci	Computer Science I, Object Oriented Programming
Other	Physics I, Formal Logic I, Philosophy of Love, Philosophy of Mind, Minds and Machines: Philosophy of Cognitive Science, Philosophy of Science, Metaphysics*

**To be completed by May 2022*