Erin H. Bugbee

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Research Interests

Sequential decision making, human and machine learning, cognitive modeling, exploration-exploitation, data science, computational social science

Education

Carnegie Mellon University — Pittsburgh, PA
Ph.D. Student in Cognitive Decision Science — 2020–2025 (Anticipated)

- Passed Qualifying Exams
- Committee Members: Cleotilde Gonzalez (Advisor), Russell Golman (Co-Advisor), Sudeep Bhatia

Carnegie Mellon University — Pittsburgh, PA
M.S. Social and Decision Sciences (Earned en route to Ph.D.) — 2020–2022

- Thesis: "Deciding When to Stop: Cognitive Models of Sequential Decisions in Optimal Stopping Tasks"
  Committee: Cleotilde Gonzalez, Russell Golman, Stephen Broomell

Brown University — Providence, RI
Sc.B. Statistics and A.B. Behavioral Decision Sciences, GPA: 3.97/4.00, Magna Cum Laude — 2016–2020

- Thesis: "Understanding Human and Artificial Decision Makers Using Reinforcement Learning"
  Advisor: Lorin Crawford

Research Experience

Dynamic Decision Making Lab, Carnegie Mellon University — Pittsburgh, PA
Graduate Research Assistant with Cleotilde Gonzalez — Fall 2020–Current

Sloman Lab, Brown University — Providence, RI
Undergraduate Research Assistant with Steven Sloman — Fall 2019–Summer 2020

Learning, Memory & Decision Lab, Brown University — Providence, RI
Undergraduate Research Assistant with Matthew Nassar — Spring 2019–Spring 2020

Summer@ICERM: Topological Data Analysis — Providence, RI
Research Experiences for Undergraduates (REU) Participant — Summer 2017

Industry Experience

Amazon Web Services (AWS) — Seattle, WA
Applied Scientist II Intern (Returning) — Summer 2023

- Machine Learning University Team, AWS Deep Learning
- Taught machine learning courses to hundreds of Amazon employees. Developed new course on topics in bias and fairness in large language models, and helped develop course on generative AI. Created and launched challenge on gender bias in machine translation.

Amazon Web Services (AWS) Seattle, WA
Applied Scientist II Intern Summer 2022

- Machine Learning University Team, AWS Deep Learning
- Developed machine learning content at Amazon's Machine Learning University (MLU) with the goal of teaching theory and application in an accessible way, both internally to Amazon employees and externally with visual explanations through MLU-Explain. Developed one of MLU-Explain's most popular articles yet on Logistic Regression. [Link] Also developed article on Reinforcement Learning. [Link]

The Walt Disney Company Orlando, FL
Sales Analytics & Insights Professional Intern Summer 2019

- Consumer Insights, Measurement, & Analytics Organization
- Performed analytics for the Disney Cruise Line, predicted Disneyland Anaheim attendance with machine learning, analyzed flight data for John Wayne Airport.

Microsoft Redmond, WA
Explore Intern (Program Management and Software Engineering) Summer 2018

- Microsoft Support Engineering Group, Universal Store Team, Cloud + AI Division
- Developed portal that incorporates Microsoft Support case submission, chatting with a Virtual Agent, and the handling of customer service data.

Publications

1. **Bugbee, E. H.**, Nguyen, T., & Gonzalez, C. (2024). Applications of Instance-Based Learning Theory: Using the SpeedyIBL Library to Construct Computational Models. In Proceedings of the XI Latin American Conference on Human Computer Interaction (CLIHC '23). Association for Computing Machinery.

2. **Bugbee, E. H.**, & Gonzalez, C. (2022). Deciding When to Stop: Cognitive Models of Sequential Decisions in Optimal Stopping Tasks. Master's Thesis, Carnegie Mellon University. https://doi.org/10.1184/R1/20492877

3. **Bugbee, E. H.**, & Gonzalez, C. (2022). Making Predictions Without Data: How an Instance-Based Learning Model Predicts Sequential Decisions in the Balloon Analog Risk Task. In *Proceedings of the Annual Meeting of the Cognitive Science Society*, 44.

4. **Bugbee, E. H.**, McDonald, C., & Gonzalez, C. (2022). Leveraging Cognitive Models for the Wisdom of Crowds in Sequential Decision Tasks. *Paper presented at Virtual MathPsych/ICCM 2022.* Via mathpsych.org/presentation/751.

5. Golman, R., **Bugbee, E. H.**, Jain, A., & Saraf, S. (2022). Hipsters and the Cool: A Game Theoretic Analysis of Identity Expression, Trends, and Fads. *Psychological Review*, 129(1), 4–17. https://doi.org/10.1037/rev0000341

6. McDonald, C., Gonzalez, C., Blaha, L., Lebiere, C., Fiechter, J., **Bugbee, E. H.**, & McCormick, E. N. (2021). Diverse experience leads to improved adaptation: An experiment with a cognitive model of learning. *Paper presented at Virtual MathPsych/ICCM 2021.* Via mathpsych.org/presentation/615.

7. Savard, C., **Bugbee, E. H.**, McGuirl, M. R., & Kinnaird, K. M. (2020). SuPP & MaPP: Adaptable Structure-Based Representations For MIR Tasks. In *Proceedings of the 21st International Society for Music Information Retrieval Conference*, 2020, pp. 335–342.

8. McGuirl, M. R., Kinnaird, K. M., Savard, C., & **Bugbee, E. H.** (2018). SE and SNL diagrams: Flexible data structures for MIR. In *Proceedings of the 19th International Society for Music Information Retrieval Conference*, 2018, (pp. 341-347).

Working Papers

- **Bugbee, E. H.**, & Gonzalez, C. (2024). "How Feedback Promotes Learning and Knowledge of the Distribution of Values Hinders Exploration in Optimal Stopping Tasks." In preparation for submission at CogSci 2024.
- **Bugbee, E. H.**, & Gonzalez, C. (2024). "A Cognitive Model for Explaining Sequential Decisions and Learning in Optimal Stopping Tasks." R&R at Psychological Review.
- Gonzalez, C., Aggarwal, P., **Bugbee, E. H.**, & Phan, D. N. (2024). "Cognitively-Inspired Signaling in Security Games to Increase Adversarial Compliance." In preparation.
- Tatlidil, S., **Bugbee, E. H.**, Dick, M., Hemmatian, B., & Sloman, S. (2024). "Algorithms as Advisors in the Future of the Workplace." In preparation.

Educational Materials

1. **Bugbee, E. H.**, Kamat, A., & Wilber, J. (2023). *Reinforcement Learning.* MLU-Explain from Amazon's Machine Learning University. https://mlu-explain.github.io/reinforcement-learning/
2. **Bugbee, E. H.**, & Wilber, J. (2022). *Logistic Regression.* MLU-Explain from Amazon's Machine Learning University. https://mlu-explain.github.io/logistic-regression/

Teaching

- **Instructor** at Amazon's Machine Learning University — Summer 2023
  Generative AI, Fairness in Large Language Models
- **Instructor** at Amazon's Machine Learning University — Summer 2022
  Day One Machine Learning, Tabular Data
- **Teaching Assistant** at Carnegie Mellon University — Fall 2020
  85-232: Thinking in Person vs. Thinking Online, Prof. Danny Oppenheimer
- **Teaching Assistant** at Brown University — Spring 2020
  NEUR 1660: Neural Computations Underlying Learning and Decision Making, Prof. Matthew Nassar
- **Head Teaching Assistant** at Brown University — Fall 2019
  CSCI 0100: Data Fluency for All, Prof. Amy Greenwald
- **Teaching Assistant** at Brown University — Spring 2019
  CSCI 1951a: Data Science, Prof. Ellie Pavlick
- **Teaching Assistant** at Brown University — Spring 2019
  CLPS 0220: Making Decisions, Prof. Steven Sloman
- **Teaching Assistant** at Brown University — Fall 2018
  APMA 1655: Advanced Statistical Inference I, Prof. Caroline Klivans
- **Teaching Assistant** at Brown University — Fall 2018
  PHP 1501: Essentials of Data Analysis, Prof. Roee Gutman
- **Teaching Assistant** at Brown University — Fall 2017
  CSCI 0100: Data Fluency for All, Prof. Amy Greenwald

Presentations

Talks

"A Cognitive Model for Deciding When to Stop: Explaining Sequential Decisions and Accounting for Learning in Optimal Stopping Tasks"
ELLIS Alicante/DDMLab Workshop on Human-Centered Artificial Intelligence — March 2023

"Making Predictions Without Data: How an Instance-Based Learning Model Predicts Sequential Decisions in the Balloon Analog Risk Task"
Cognitive Science Conference (CogSci 2022) July 2022

"Leveraging Cognitive Models for the Wisdom of Crowds in Sequential Decision Tasks"
International Conference on Cognitive Modeling (MathPsych/ICCM 2022) July 2022

"Cognitive Models of Sequential Choice in Optimal Stopping Tasks"
Dynamic Decision Making Laboratory Meeting, Carnegie Mellon University October 2021

"Cognitive Models of Sequential Choice in the Optimal Stopping Task"
Society for Mathematical Psychology Conference (MathPsych/ICCM 2021) July 2021

"Cognitive Models of Sequential Choice in the Optimal Stopping Task"
Center for Behavioral and Decision Research, Carnegie Mellon University April 2021

"Reinforcement Learning in Dynamic Environments for Place Cell Remapping"
Learning, Memory, & Decision Lab, Brown University November 2019

"Comparing Songs Without Listening"
Brown Math Slam, Society for Industrial and Applied Mathematics/AWM November 2018

"SE and SNL Diagrams: Flexible Data Structures for MIR"
The International Society for Music Information Retrieval Conference September 2018

Comparing Songs Without Listening
Summer@ICERM August 2017

Poster Presentations

"The Effect of Feedback and Knowledge of the Distribution of Option Values on Learning in Sequential Search"
Society for Judgment and Decision Making Conference November 2023

"Deciding When to Stop: Cognitive Models of Sequential Decisions in Optimal Stopping Tasks"
3rd Workshop on Mental Effort November 2022

"Algorithms as Advisors in the Future of the Workplace"
Society for Judgment and Decision Making Conference December 2020

"SuPP and MaPP: Novel MIR Data Structures Inspired by TDA"
The International Society for Music Information Retrieval Conference September 2018

"Comparing Songs Using Matrix Pattern Preservation"
Women in Data Science Conference March 2018

"Comparing Songs Using Matrix Pattern Preservation"
Joint Mathematics Meetings January 2018

"Comparing Songs Using Matrix Pattern Preservation"
NEMISIG (Northeast Music Informatics Special Interest Group) January 2018

Workshops

"Applications of Instance-Based Learning Theory: Using the SpeedyIBL Library to Construct Computational Models"
CLIHC 2023: XI Latin American Conference on Human Computer Interaction — October 2023

"The Power of Data and Data Visualization"
Intern from Home Cohort — June-August 2020

"Introduction to R Programming"
Brown Datathon — February 2018

Grants and Fellowships

- Presidential Fellowship, Tata Consultancy Services — 2024
- Presidential Fellowship, Dietrich College of Humanities and Social Sciences, Carnegie Mellon University — 2020–2025
- National Science Foundation Graduate Research Fellowship Program Applicant — 2019, 2021
- Brown Data Science Fellow — 2019–2020
- Collaborate@ICERM Grant: Topological Data Analysis and Music Information Retrieval, ICERM — 2019

Honors and Awards

- Opportunity Scholar for posit::conf(2023) — 2023
- American Statistical Association (ASA) StatsGrad Award Winner — 2020
- Premium for Excellence in Behavioral Decision Sciences, Brown University — 2020
- Bob Petrocelli Head Undergraduate TAship, Brown University Department of Computer Science — 2020
- Class of '81 Undergraduate TAship for Women in CS, Brown University Department of Computer Science — 2019
- Disney Data & Analytics Women Scholarship Recipient — 2019
- Outstanding Poster Award, Joint Mathematics Meetings — 2018

Conferences and Travel Awards

Society for Judgment and Decision Making Conference — Remote
The Society for Judgment and Decision Making — November 2023

CLIHC 2023: XI Latin American Conference on Human Computer Interaction — Puebla, Mexico
CLIHC — October 2023

posit::conf(2023) — Chicago, Illinois
Posit (formerly RStudio) — September 2023
- Opportunity Scholar

CascadiaR Conference — Seattle, Washington
Fred Hutch Cancer Center — August 2023
- CascadiaR Scholarship

ELLIS Alicante/DDMLab Workshop on Human-Centered AI — Alicante, Spain
European Laboratory for Learning and Intelligent Systems (ELLIS) Alicante — March 2023

3rd Workshop on Mental Effort — Providence, Rhode Island
Brown University — November 2022

CogSci 2022 — Toronto, Ontario
Cognitive Science Society — July 2022

MathPsych/ICCM 2022 — Remote
Society for Mathematical Psychology — July 2022

CogSci 2021 — Remote
Cognitive Science Society — July 2021

MathPsych/ICCM 2021 — Remote
Society for Mathematical Psychology — July 2021

Society for Judgment and Decision Making Conference — Remote
The Society for Judgment and Decision Making — December 2020

ISMIR 2020 — Remote
International Society for Music Information Retrieval — October 2020

– ISMIR Student Travel Grant

ASA Women in Statistics and Data Science 2020 — Remote
Women in Data Science Conference — October 2020

– ASA WSDS Student Travel Award

ASA Women in Statistics and Data Science 2019 — Bellevue, WA
Women in Data Science Conference — October 2019

– ASA WSDS Student Travel Award, Brown Data Science Initiative Travel Grant

Disney Data & Analytics Conference (DDAC) — Orlando, FL
The Walt Disney Company — August 2019

News vs. Truth Seminar with Jon Klein and Steven Sloman — Providence, RI
Brown University — Spring 2019

Collaborate@ICERM 2019 — Providence, RI
ICERM — January 2019

– ICERM Grant

Machine Intelligence Conference — Cambridge, MA
MIT Media Lab — November 2018

ISMIR 2018 — Paris, France
International Society for Music Information Retrieval — September 2018

– ISMIR Student Travel Grant, Brown Data Science Initiative Travel Grant

Disney Data & Analytics Conference (DDAC) — Orlando, FL
The Walt Disney Company — August 2018

– Disney Data & Analytics Women Scholarship

Women in Data Science (WiDS) — Worcester, MA
Worcester Polytechnic Institute — March 2018

Northeast Music Information Special Interest Group (NEMISIG) — Providence, RI
Brown University and Spotify — January 2018

Joint Mathematics Meetings San Diego, CA
The American Mathematical Society and the Mathematical Association of America January 2018
– JMM Student Travel Grant, ICERM Travel Grant

Professional Affiliations and Activities

- Department of Social and Decision Sciences, Carnegie Mellon University 2022–Current
  Climate Committee Graduate Representative
- Society for Mathematical Psychology 2021–Current
  Trainee Member
- Women of Mathematical Psychology 2021–Current
  Trainee Member
- Society for Judgment and Decision Making 2020–Current
  Student Member
- Cognitive Science Society 2020–Current
  Student Member
- American Statistical Association 2018–Current
  Student Member
- Brown Data Science Club 2016–2020
  President (2019–2020)
  Marketing Team Leader (2018–2019)
  Outreach Team Member (2017–2018)
  Club Member (2016–2017)
- Center for Statistical Sciences and Department of Biostatistics 2018–2020
  Diversity & Inclusion Committee Undergraduate Representative
- Statistics Departmental Undergraduate Group 2018–2020
  Leader
- Science Tour Guide 2017–2020
  Leader
- The Brown Daily Herald 2016–2020
  Copy-Editor

Skills

- **Programming:** R, Python, MATLAB, SQL, Java, Javascript, HTML, CSS, Svelte
- **Tools:** R Markdown, Quarto, Shiny, Jupyter Notebooks, LaTeX, Git, Github
- **Experiments:** Qualtrics, mTurk, Prolific, nodeGame
- **Data Visualization:** ggplot2, Matplotlib, Pandas, Tableau, D3.js