Benjamin Brindle

Contact Information

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Research Interests

Time Series Analysis, Stochastic Processes, Clustering Algorithms, Applied Probability, Operations Research, Markov Chains

Education

Johns Hopkins University, Baltimore, MD

Ph.D. in Applied Mathematics & Statistics | May 2026

- GPA: 4.0/4.0
- Advisor: Dr. Daniel Naiman

M.S. in Applied Mathematics & Statistics | December 2024

- GPA: 4.0/4.0

Lehigh University, Bethlehem, PA

B.S. in Mathematics | January 2021

- GPA: 3.96/4.0
- Advisor: Dr. Miranda Teboh-Ewungkem
- Senior Thesis: *A Mathematical Understanding of Red Blood Cell Dynamics*

Publications

Preprints

Brindle, B., Hull, T. D., Malgaroli, M., & Charon, N. (2024). VISTA-SSM: Varying and Irregular Sampling Time-series Analysis via State Space Models. *Psychological Methods*. https://doi.org/10.48550/arXiv.2410.21527

Presentations

International Conferences

Brindle, B. (2021, June 16). *Bifurcation Analysis in a Mathematical Model for Red Blood Cell Dynamics* [Talk]. 2021 Annual Meeting of the Society for Mathematical Biology, virtual.

Brindle, B. (2019, July 23). *The Mathematical Role of Immunity on the Within-Host Malaria Parasite Dynamics* [Poster]. 2019 Annual Meeting of the Society for Mathematical Biology, Montreal, QC, Canada.

- Received a grant (NSF DMS-1815912) used in travel to the conference.

National Conferences

Brindle, B. (2021, January 8). *Mathematical Understanding of Red Blood Cell Dynamics* [Talk]. 2021 Joint Mathematics Meetings, virtual. https://meetings.ams.org/math/jmm2021/meetingapp.cgi/Paper/3869

- Received an Outstanding Poster Presentation Award.

Brindle, B. (2020, November 1). *Mathematical Understanding of Red Blood Cell Dynamics* [Talk]. 12th Annual Undergraduate Research Conference at the Interface of Biology and Mathematics, virtual.

Regional Conferences

Brindle, B. (2021, February 13). *Bifurcation Analysis in a Mathematical Model for Red Blood Cell Dynamics* [Talk]. 35th Annual Moravian College Student Mathematics Conference, virtual.

Brindle, B. (2020, February 22). *Mathematical Modeling of Red Blood Cell Dynamics Under Malaria Parasitemia* [Talk]. 34th Annual Moravian College Student Mathematics Conference, Bethlehem, PA, United States.

Brindle, B. (2019, February 23). *The Spruce Budworm Model and Its Extensions* [Talk]. 33th Annual Moravian College Student Mathematics Conference, Bethlehem, PA, United States.

Seminars

Brindle, B. (2024, April 9). *Time Series Clustering with Mixtures of Linear Gaussian State Space Models* [Talk]. 2024 Johns Hopkins University Applied Mathematics & Statistics Student Seminar, Baltimore, MD, United States.

Research Experience

Johns Hopkins University, Baltimore, MD

Graduate Research Assistant | Department of Applied Mathematics & Statistics | August 2023 – present

- Write generative Python algorithm to cluster irregularly sampled time series for applications in medicine and industry.
- Collaborate with faculty at three universities and present research findings to colleagues in department student seminar.

Talkspace, New York, NY (remote)

Research Analyst Intern | Network & Clinical Quality | May 2022 – August 2023

- Developed network model with natural language processing of therapy transcripts to study patient diagnosis and recovery.
- Employed deep and convolutional neural networks on big data with Python and solved errors in data pipeline with SQL.
- Created datasets from existing clinical, survey, and transcript sources to streamline analysis process.

Princeton University, Princeton, NJ (remote)

Deep Learning Theory Summer School | July 2021 – August 2021

- Studied current developments in deep learning theory and its applications under supervision of top researchers.

Lehigh University, Bethlehem, PA

Undergraduate Research Assistant | Department of Mathematics | September 2018 – May 2021

- Mathematically modeled red blood cell dynamics using dynamical systems and numerical methods with MATLAB.
- Collaborated with researchers at Los Alamos National Laboratory to study and use data to model malarial dynamics in humans.

Teaching Experience

Johns Hopkins University, Baltimore, MD

Teaching Assistant | Internship Network in the Mathematical Sciences

- Introductory Python, Statistics, and Machine Learning Workshops for PhD Students — Fall 2022 – Spring 2025
  - Designed interactive workbooks, fielded students' questions, and debugged code during monthly weekend-long workshops.

Teaching Assistant | Department of Applied Mathematics & Statistics

- EN.553.692: Mathematical Biology — Spring 2022, Spring 2024, Spring 2025
  - Enhanced students' understanding with detailed solution guides and interactive office hours.
  - Delivered course lectures to class of 10 students when invited by instructor.
- EN.553.691: Dynamical Systems — Fall 2024
  - Taught weekly discussion sessions for 10 students to reinforce key concepts through examples.
- EN.553.171: Discrete Mathematics — Summer 2024
  - Provided daily one-on-one office hours for students in fast-paced summer course.
- EN.553.620: Probability — Fall 2021
  - Assigned grading responsibilities to 5 graduate and undergraduate teaching assistants.

Lehigh University, Bethlehem, PA

Grader | Department of Mathematics

- MATH 319: Introduction to Differential Equations — Spring 2021
- MATH 301: Principles of Analysis I — Fall 2020
- MATH 022: Calculus II — Spring 2019, Spring 2020
- MATH 033: Honors Calculus III — Fall 2019

Group Tutor | Center for Academic Success

- MATH 022: Calculus II — Fall 2019 – Spring 2021

Private Tutor

- MATH 023: Calculus III — Fall 2020
- MATH 022: Calculus II — Spring 2019, Spring 2020
- MATH 052: Survey of Calculus II — Spring 2019
- MATH 051: Survey of Calculus I — Fall 2018
- CHM 030: Introduction to Chemical Principles — Fall 2018 – Spring 2019

Mentorship

Johns Hopkins University, Baltimore, MD

Directed Reading Program Mentor | Department of Applied Mathematics & Statistics | Fall 2024

- Created curriculum for two undergraduate students to learn about Kalman filter through project- and presentation-based work.

Awards

Johns Hopkins University, Baltimore, MD

Apprentice Teaching Fellow | Department of Applied Mathematics & Statistics | Spring 2025

- Awarded for commitment to excellence in instruction.

Newman Family Fellowship | Department of Applied Mathematics & Statistics | AY 2022–2023

National Science Foundation Fellow | Internship Network in the Mathematical Sciences | Summer 2022

Gordon Croft Endowed Fellowship | Whiting School of Engineering | AY 2021–2022

Lehigh University, Bethlehem, PA

Thornburgh Mathematics Prize | Department of Mathematics | May 2021

- Awarded for maintaining an outstanding record in advanced mathematics courses.

President's Scholar Award | Department of Mathematics | January 2021 – August 2021

- Received three semesters' full tuition for achieving an undergraduate GPA of 3.75+ to pursue a thesis in mathematics.

Undergraduate Research Grant | College of Arts and Sciences | April 2019

- Awarded $750 for the proposal titled "The Relation of Evolving Drug-Resistant Pathogens to Treatment Drugs," which funded travel to Los Alamos National Laboratory in January 2020.

Leadership

Johns Hopkins University, Baltimore, MD

Department Steward | Department of Applied Mathematics & Statistics | June 2024 – present

- Streamline communication between university officials and 100+ Ph.D. students, ensuring prompt resolution of concerns.

Academic Hearing Panel Member | Whiting School of Engineering | November 2022 – present

- Serve as only graduate student representative on disciplinary panels, reaching fair decisions in cases of academic misconduct.

Lehigh University, Bethlehem, PA

President and Secretary | Latin Dance Club | August 2018 – May 2021

- Managed the planning, promotion, and execution of club activities and choreography.

Secretary and Treasurer | East Fifth Records | April 2018 – May 2021

- Assisted in establishing the first student-run record label at Lehigh University.

Skills

Programming Languages

- Python (PyTorch, scikit-learn, pandas, NumPy)
- MATLAB
- SQL
- Java
- R

Tools

- Microsoft Office (Word, Excel, PowerPoint)
- Git
- LaTeX

Six Sigma Yellow Belt Certification | Lehigh University | December 2018