

DAVID BREWSTER

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EDUCATION

Harvard University

Ph.D. Applied Mathematics

Advisor #1: Martin Nowak (Evolutionary Dynamics)

Advisor #2: Philippe Cluzel (Antibiotic Resistance)

S.M. Applied Mathematics

Fall 2022–Present
expected Spring 2027

Spring 2025

University of Illinois at Urbana-Champaign

B.S. Computer Science

B.S. Mathematics

Advisor #1: Alexander Yong (Algebraic Combinatorics)

Advisor #2: Kay Kirkpatrick (Biophysics)

Fall 2016–Spring 2021

Spring 2021

Spring 2021

AFFILIATIONS

- **Epistemix** — *Research Fellow* Summer 2025
- **Harvard Department of Organismic and Evolutionary Biology (OEB)** — *Graduate Student (Affiliate)* Fall 2025–Present
- **Harvard Department of Molecular and Cellular Biology (MCB)** — *Graduate Student (Affiliate)* Fall 2024–Present
- **Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS)** — *Graduate Student (Primary)* Fall 2022–Present

AWARDS

- **Harvard University Graduate School of Arts and Sciences Prize Fellowship** Fall 2022–Present
- **H. Roy Brahana Prize** — *Most Exceptional Undergraduate Mathematics Career* Spring 2021

TALKS

- **“Maintaining diversity in structured populations”**, *Invited seminar talk at SOKENDAI - The Graduate University for Advanced Studies, Research Center for Integrative Evolutionary Science*, October 8, 2025
- **“Fixation times on directed graphs”**, *Contributed talk at Evolutionary Graph Theory Workshop at Max-Planck Institute for Evolutionary Biology*, October 16, 2024
- **“Fixation times on directed graphs”**, *Invited talk at math research group seminar at Charles University*, October 14, 2024
- **“Fixation times on directed graphs”**, *Contributed talk at Workshop on Modeling and Applications of Evolutionary Game Theory*, December 8, 2023
- **“Evolutionary graph theory: fixation times on directed graphs”**, *Invited talk at UIUC Algebra-Geometry-Combinatorics seminar*, November 2, 2023
- **“Evolutionary graph theory: fixation times on directed graphs”**, *Harvard Theoretical CS “TGINF” PhD/Postdoc seminar*, October 26, 2023
- **“Derandomization using random strings”**, *Harvard Theoretical CS “TGINF” PhD/Postdoc seminar*, December 1, 2022
- **“On one-way functions and Kolmogorov complexity”**, *Harvard Theoretical CS Pseudorandomness reading group*, September 28, 2022
- **“Coxeter groups and properness”**, *Contributed talk at Central Cornfields Combinatorial Conference*, May 24, 2021

PAPERS

7. D. A. Brewster, Y. Huang, M. Mitzenmacher, and M. A. Nowak. Mixed birth-death and death-birth updating in structured populations. *ITCS*, 2026
6. M. Jotautaitė, L. Caviola, **D. A. Brewster**, and T. Hagendorff. Speciesism in ai: Evaluating discrimination against animals in large language models. *arXiv preprint arXiv:2508.11534*, 2025
5. **D. A. Brewster**, J. Svoboda, D. Roscow, K. Chatterjee, J. Tkadlec, and M. A. Nowak. Maintaining diversity in structured populations. *PNAS Nexus*, 4:pgaf252, 2025
4. **D. A. Brewster**, M. A. Nowak, and J. Tkadlec. Fixation times on directed graphs. *PLOS Computational Biology*, 20:e1012299, 2024
3. J. Balogh, D. A. Brewster, and R. Hodges. Proper elements of Coxeter groups. *European Journal of Mathematics*, 10, 2024
2. D. Inafuku, K. L. Kirkpatrick, O. Osuagwu, Q. An, **D. A. Brewster**, and M. Z. Nakib. Channel capacity of the ribosome. *Physical Review E*, 108:044404, 2023
1. D. A. Brewster, R. Hodges, and A. Yong. Proper permutations, Schubert geometry, and randomness. *Journal of Combinatorics*, 13:561–574, 2022

TEACHING

· Mathematical Biology - Evolutionary Dynamics (MATH 242/243) — <i>Teaching Fellow</i>	Fall 2023–Fall 2025
· Topics in Theory for Society: The Theory of Algorithmic Fairness (COMPSCI 226r) — <i>Teaching Fellow</i>	Spring 2024
· Algorithms for Data Science (COMPSCI 224) — <i>Teaching Fellow</i>	Fall 2023
· Perspective Charter Schools Future Techleaders Workshop — <i>Co-instructor, Co-organizer</i>	Fall 2020–Spring 2021
· Intro to Algorithms & Models of Computation (CS 374) — <i>Course Assistant</i>	Fall 2020–Spring 2021
· Software Design Studio (CS 126) — <i>Senior Course Assistant</i>	Fall 2017, Spring 2019–Spring 2020
· Honors Intro to Computer Science (CS 196) — <i>Homework Writer</i>	Fall 2017
· New Horizons GSST STEM Camp: Web Design — <i>Instructor</i>	Summer 2016

GROUPS

· Greener Scott Scholars Mentorship Program — <i>Mentor</i>	Fall 2023–Spring 2024
· Blacks and African Americans in Computing (BAAC @ Illinois) — <i>Organizer</i>	Spring 2019–Spring 2021
· National Society of Black Engineers (NSBE) - UIUC Chapter — <i>Member</i>	Fall 2016–Spring 2021
· Illinois Programming League (IPL) — <i>Bronze at 2017 Mid-Central Regional ACM-ICPC</i>	Fall 2016–Fall 2017

UNDERGRADUATE RESEARCH EXPERIENCE

· New Horizons in Theoretical Computer Science	Summer 2021
· Illinois Combinatorics Lab for Undergraduate Experiences (ICLUE) — <i>Algebraic Combinatorics</i>	Spring 2020–Spring 2021
· Biocomputation Group — <i>Protein Folding and Ribosomal Modeling</i>	Fall 2019–Spring 2021
· Supercomputing Genomics Group — <i>Predicting Tumor Cell Line Responses — Institute for Genomic Biology¹</i>	Spring 2017

PROFESSIONAL EXPERIENCE

· Akuna Capital — <i>Junior Quantitative Developer, Trade Quality</i> — <i>Chicago, IL</i>	Summer 2021–Summer 2022
· Citadel Securities — <i>Software Engineering Intern, Options Market Making</i> — <i>New York, NY</i>	Summer 2019
· Citadel — <i>Software Engineering Intern, Global Quantitative Strategies</i> — <i>Chicago, IL</i>	Fall 2018
· Two Sigma — <i>Software Engineering Intern, Data Engineering</i> — <i>New York, NY</i>	Summer 2018
· Microsoft — <i>Software Engineering Intern, Azure Compute</i> — <i>Redmond, WA</i>	Spring 2018
· Google — <i>Software Engineering / Site Reliability Engineering Intern, Zipit (Reviews)</i> — <i>New York, NY</i>	Summer 2017

TOOLS

Programming Languages	Python, C/C++, Rust, TypeScript, SageMath, Mathematica, F#, J (APL Dialect)
Frameworks	NetworkX, Node.js, NumPy, Pandas, React, Seaborn, Tensorflow, Torch
Other Tools	AWS, Azure, Bazel, CMake, GCP, K8s, OpenMP, OR-Tools, PyBind, Slurm

¹In collaboration with Argonne National Laboratories