

ELIOT LEE JUHON HODGES

Education:

- 8/2021-5/2025 HARVARD UNIVERSITY CAMBRIDGE, MA
Mathematics, AB expected 2025. GPA: 4.0
Honors:
- 2021-2024 John Harvard Scholarship
 - 2023 Detur Book Prize
 - Wendell Prize Finalist
 - 2020 US Presidential Scholar
- 8/2013-6/2020 KENT DENVER SCHOOL ENGLEWOOD, CO
High School diploma, June 2020; GPA 4.454 (weighted)

Publications and Preprints:

1. G. Barkley, C. Defant, E. Hodges, N. Kravitz, and M. Lee, Bender–Knuth billiards in Coxeter groups, to appear in *Forum of Mathematics, Sigma*, arXiv:2401.17360.
2. E. Hodges, The distribution of sandpile groups of random graphs with their pairings, *Transactions of the American Mathematical Society*, 377 (12 2024), 8769–8815, arXiv:2311.07078.
3. E. Hodges, On promotion and quasi-tangled labelings of posets, *Annals of Combinatorics*, 28 (2024), 529–554, arXiv:2208.08665.

Presentations:

1. E. Hodges, Gauss composition and Bhargava cubes over a Dedekind domain, *Arithmetic Statistics Seminar at Harvard University*, December 16, 2024.
2. E. Hodges, The distribution of sandpile groups of random graphs with their pairings, *AIM Special Session on Graphs and Matrices*, Joint Mathematics Meetings, January 4, 2024.
3. E. Hodges, On Promotion and Quasi-tangled Labelings of Posets, *AMS Contributed Paper Session on Combinatorics I*, Joint Mathematics Meetings, January 5, 2023.
4. E. Hodges, Random Groups with Hermitian Pairings, *Arithmetic Statistics Seminar at Harvard University*, May 6, 2024.
5. E. Hodges, Bender–Knuth Billiards, *Math Table at Harvard University*, November 29, 2023.
6. E. Hodges, The Distribution of Sandpile Groups of Random Graphs with their Pairings, *Arithmetic Statistics Seminar at Harvard University*, December 5, 2022.
7. E. Hodges, Extended Promotion and Quasi-tangled Labelings, *Math Table at Harvard University*, October 5, 2022.

Research Experience:

- 5/2024-present HARVARD COLLEGE RESEARCH PROGRAM CAMBRIDGE, MA
Two research projects in arithmetic statistics. The first, supervised by Prof. Melanie Wood: research on the distribution of cokernels of Hermitian matrices with their pairings. The second, supervised by Prof. Melanie Wood and Dr. Ashvin Swaminathan: research to determine the average amount of 3-torsion in class groups of orders of quadratic extensions of global fields.
- 8/2023-5/2024 MATH 91R CAMBRIDGE, MA
Research in arithmetic statistics, supervised by Prof. Melanie Wood: determined the distribution of sandpile groups with their pairings, answering a conjecture from 2015 due to Clancy, Leake, and Payne resulting in a paper accepted for publication.
- 5/2023-8/2023 DULUTH SUMMER MATHEMATICS RESEARCH PROGRAM DULUTH, MN
Summer research experience at the Duluth Mathematics REU. Concluded sandpile research and wrote paper in algebraic combinatorics on Bender–Knuth Billiards in Coxeter groups.

5/2022-7/2022 Research in combinatorics, specifically in discrete dynamical systems. Studied extended promotion and quasi-tangled labelings of posets, culminating in a published research paper. Advised by Professor Joe Gallian, Dr. Colin Defant, Noah Kravitz, and Amanda Burcroff.

5/2021-7/2021 CU SUMMER MATH RESEARCH EXPERIENCE BOULDER, CO
Summer research project at CU Boulder in Lie algebra. Studied derived Poisson structures on \mathfrak{sl}_2 under the guidance of Dr. Yining Zhang. Reviewed the basic knowledge of noncommutative Poisson structures, cyclic/Hochschild homology, etc., and attempted to compute this derived Poisson structure on $U(\mathfrak{sl}_2)$ explicitly.

Work Experience:

8/2022-present COURSE ASSISTANT CAMBRIDGE, MA
Worked as a course assistant for the following courses: Math 129: Number Fields; Math 155R: Combinatorics; Math 137: Algebraic Geometry; Math 122: Abstract Algebra I. Responsibilities include teaching weekly recitations; holding weekly office hours; grading problem sets; mentoring student presentations; and creating course notes.

1/2022-present LOEB MUSIC LIBRARY CAMBRIDGE, MA
Work at the circulation desk at the Loeb Music Library at Harvard University.

Extracurricular Activities:

9/2021-present HARVARD MATHEMATICS DIRECTED READING PROGRAM CAMBRIDGE, MA
Independent study reading project supervised by graduate students. Mentored by Charles Wang, Elia Gorokhovsky, and Oakley Edens. Topics include étale cohomology, elliptic curves with complex multiplication; the basic theory of elliptic curves; abstract harmonic analysis; Fourier analysis on groups; Schubert calculus; the representation theory of semisimple Lie algebras.

10/2022-present HARVARD UNDERGRADUATE MATH ASSOCIATION CAMBRIDGE, MA
President of the Harvard Undergraduate Mathematics Association, a student organization dedicated to promoting undergraduate appreciation of math, encouraging social interaction among math students, and fostering an environment of inclusivity in the math department. In addition to running the club at large, responsibilities include running social events and securing sponsorships.

2021-present U.S. PRESIDENTIAL SCHOLAR ADVISOR DENVER, CO
Advisor to incoming classes of presidential scholars. Coordinate and host weekly virtual events for recent scholar alumni and helped organize U.S. Presidential Scholar Week of Connection in the summers of 2021, 2022, and 2024. Served as the Lead Advisor in 2023, where I directed the advising program and organized the entire 2023 Week of Connection.

2006-present CELLO DENVER, CO
Have played the cello since age 4; practice 2-5 hours daily; currently study with Kee Kim of the Parker Quartet in residence at Harvard University. Play recitals, concerts, and gigs around campus with other student musicians.

Community Service:

2011-present INTUNE STRING ENSEMBLE DENVER, CO
Cellist; President of the Board
Established 501(c)(3) nonprofit string ensemble whose mission is to perform and raise money for charitable organizations that serve children in need due to poverty, health crises or natural disaster; to date have donated in cash and time over \$100,000. Website www.intunestrings.org.