

Bryan Lu

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Padelford C-8G



blu-bird.github.io



github.com/blu-bird

Education

University of Washington Ph.D. in Mathematics Sep 2024 – Present
Cornell University Bachelor of Arts in Mathematics, Computer Science Sep 2020 – Dec 2023
summa cum laude with Distinction in All Subjects
Software: Python, Sage, Kotlin, Java, OCaml, C++/C, Macaulay2

Research

Branching rules for the 0-Hecke algebra (2023) Senior thesis
 \mathfrak{S}_n -equivariant Koszul algebras from the Boolean lattice (with Delargy et al., 2023) Report, poster
Simplicial complexes and jeu de taquin theory (with Dantas e Moura and Woodruff, 2023) Report
UMN Algebra and Combinatorics REU June 2023 – August 2023

- Investigated how jeu de taquin slides act by simplicial isomorphisms on complexes arising from Young's lattice
- Computed and studied relationships between \mathfrak{S}_n -representations arising from Koszul algebras associated to Boolean lattice
- Attended Summer Student Representation Theory Seminar to learn basics and directions of research

Modified Lights Out on generalized Petersen graphs (with Fiorini et al., 2022) Poster, paper (in preparation)
Enumerating possible preference orderings of points in the plane (with Delargy et al., 2022) Poster
Moravian University Discrete Mathematics REU June 2022 – July 2022

- Analyzed a class of combinatorial games, modeled geometric configurations arising from a combinatorial voting system
- Presented progress made in two projects as a poster at the 2023 Joint Mathematics Meetings

Presentations

\mathfrak{S}_n -equivariant Koszul algebras from the Boolean lattice (Poster, Joint Mathematics Meetings 2024) January 2024
Simplicial complexes and jeu de taquin theory (Talk, Joint Mathematics Meetings 2024) January 2024
Branching rules for the 0-Hecke algebra (Talk, Cornell Discrete Combinatorics and Geometry Seminar) November 2023
Enumerating possible preference orderings of points in the plane (Poster, Joint Mathematics Meetings 2023) January 2023
Modified Lights Out on generalized Petersen graphs (Poster, Joint Mathematics Meetings 2023) January 2023
Enumerating possible preference orderings of points in the plane (Poster, Cornell Fall Forum) November 2022

Teaching

Hampshire College Summer Studies in Mathematics (HCSSiM): Junior Staff Jul 2024 – Aug 2024

- Led inquiry-based classes in undergraduate-level mathematics for high school students for four weeks
- Taught courses in abstract algebra and combinatorics covering Galois theory, algebraic number theory, and matroids

Cornell Math Department: Grader for Theoretical Linear Algebra and Calculus (MATH 2230/2240) Aug 2021 – Dec 2023

- Graded and provided detailed feedback on proof-based weekly problem sets
- Developed discussion-based activities intended to expose students to a wide range of mathematical fields

AwesomeMath Summer Program: Instructor, Teaching Assistant Jun 2020 – Aug 2021

- Mentored students in problem solving and critiqued students' proof-writing skills to improve their score in competitions
- Developed curricula for and taught classes in algebra, geometry, combinatorics, and number theory

Projects

JAEK (Just Another Eta Compiler): x86 Compiler January 2023 – May 2023

- Implemented full compiler stack to lex, parse, typecheck, translate, and optimize x86 machine code for C-like language Eta
- Awarded for extremely high correctness and high speed of compiled code

agda-unimath: Univalent Mathematics Library August 2022 – December 2022

- Formalized theorems in elementary number theory by writing code in Agda
- Helped refactor and clean up the library's large codebase for clarity

RatHunt: Puzzlehunt Website Sep 2021 – Dec 2021

- Created website using OCaml-based tech stack that hosts a variety of interactive puzzles
- Principal creative for designing and implementing puzzles, and developing concept art for website

Activities

The Assorted Aces: Performance Director, Executive Board

Sep 2020 – May 2024

- Organized practices, rehearsals, and logistics for performances throughout the semester, including for annual showcase
- Ran recruitment and auditions for new members, most being complete beginners to dance

Awards/Honors

Kieval Prize Cornell Mathematics Department

Spring 2024

Phi Beta Kappa Theta Chapter

Spring 2023

William Lowell Putnam Exam Score: 8

Dec 2021