DYLAN PENTLAND

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DPENTLAND.GITHUB.IO

EDUCATION

Harvard 2022- Present
PhD in Mathematics

MIT 2018 - 2022
Mathematics 5.0/5.0 GPA

The Newman School, Boston, MA 2014-2018
Valedictorian

RESEARCH INTERESTS

I am interested in number theory, algebraic geometry, and representation theory.

PUBLICATIONS

Filtrations on block subalgebras of restricted universal enveloping algebras 2021
Journal of Algebra and Applications

Computing L-polynomials of Picard curves in polylogarithmic time 2021
Mathematics of Computation

Coefficients of Gaussian Polynomials Modulo N 2020
Electronic Journal of Combinatorics

RESEARCH

Extensions of mod p representations of local division algebras 2021-
REU project at UMichigan, supervised by Prof. Tasho Kaletha and Karol Koziol. Determines the extension groups of smooth irreducible representations of a division algebra D over a non-Archimedean local field by studying the structure of $\mathrm{H}^\bullet(I_1, \pi)$ where $I_1 = 1 + \varpi_D \mathcal{O}_D$ and π is some irreducible representation of $D^\times$. We have submitted this to the *Journal de Théorie des Nombres de Bordeaux*. Can be accessed here.

Filtrations on block subalgebras of restricted universal enveloping algebras 2020-2021
Project for Summer Program in Undergraduate Research at MIT suggested by Prof. Roman Bezrukavnikov. Studies the associated graded algebras for the PBW filtration and related filtrations on blocks of restricted universal enveloping algebras. Published in the *Journal of Algebra and its Applications*. Can be accessed here.

Computing L-polynomials of Picard curves in polylogarithmic time 2019-2021
Project suggested by Prof. Andrew Sutherland. Develops and implements the first practical algorithm to compute the zeta function of a curve in genus > 2. The implementation was done in SAGE and PARI/GP, and has applications to cryptography. Published in *Mathematics of Computation*, and can be accessed here.

Coefficients of Gaussian Polynomials Modulo N 2018
Resolves and extends a conjecture of Prof. Richard Stanley. Finalist in 2018 Regeneron STS. Presented at MAA Undergraduate Poster Session at JMM in January, 2018. Published in *The Electronic Journal of Combinatorics*. Can be accessed here.

AWARDS

NSF Fellowship **2022**

Regeneron STS Finalist **2018**

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TEACHING AND OTHER ACTIVITIES

DRP Mentor 2023
Mentored an undergraduate student in étale cohomology and p-adic Hodge theory.

Head Counselor at PROMYS 2022
Managed program for motivated high school students learning number theory.

Mentor for 18.S097 2021
Mentor for a proof-writing workshop.

Directed Reading Program at MIT 2019-2021
Studied algebraic topology in 2019, differential geometry in 2020, and Deligne-Lusztig theory in 2021.

Summer HSSP Program 2019
Developed course and taught high school students linear algebra.

MIT Splash 2019, 2021
Taught short course in 2019 on covering spaces to interested high school students. Taught a course in 2021 on elliptic curve cryptography and elliptic curves over $\mathbf{C}$.

LANGUAGES/TOOLS

Java, Python, Sage, PARI/GP, LaTeX