ELAN ROTH

elanmroth@gmail.com • +1 (914) 703-7940

EDUCATION

University of Pennsylvania, Philadelphia, PA — Cumulative GPA: 3.92 **August 2021 – May 2025**
Bachelor of Arts in Logic, Information, and Computation
Minors in Computer Science, Mathematics, and Religious Studies

- Academic Honors: Phi Beta Kappa; Summa Cum Laude
- Activities: Programming Languages Seminar; Interfaith Dialogue Club (President 2022-23); Sports Analytics Seminar; Logic Seminar
- Putnam Exam: 13 (2023)

Budapest Semester in Mathematics, Budapest, Hungary **January 2024 – May 2024**

- Conducted research on unit distance graph realization with the Rényi Institute

Shalom Hartman Institute, Jerusalem, Israel **August 2020 – May 2021**
Hevruta Program

- Engaged in dialogue on religious philosophy and pluralism with 35 Americans and 35 Israelis

The Leffell School, Hartsdale, NY **September 2018 – May 2020**
High School Diploma

- AIME Qualifier (2020), Aesthetic Graphing Club (*Founder and President*)

EXPERIENCE

Fulbright Student Program, University of Waterloo, Waterloo, Ontario, Canada **September 2025 – Present**
Fulbright Visiting Research in Pure Mathematics

- Working with Dr. Barbara Csima on computable structure theory by proving optimal bounds for Scott complexity of reduced Abelian p-groups
- Presenting on Algorithmic Information theory to a seminar of graduate students and professors

University of Pennsylvania School of Engineering, Philadelphia, PA
Programming Language Research Assistant to Dr. Steve Zdancewic **May 2024 – August 2024**

- Developed a denotational semantics for IMP to ultimately work with the untyped lambda calculus
- Formally verified various properties of programming languages in Coq

Teaching Assistant for CIS 120: Programming Languages and Techniques **August 2022 – May 2025**

- Taught six semesters of weekly recitation for 20 students and instructed one-on-one office hours open to 400 students

Teaching Assistant for CIS 500: Software Foundations **August 2024 – May 2025**

- Instructed weekly office hours for 80 graduate students
- Wrote, administered, and graded three exams throughout the semester

Wharton Moneyball Academy, Philadelphia, PA **Summer 2022, 2023**
Head Teaching and Research Assistant

- Modeled baseball using Markov Chain Monte-Carlo simulations
- Managed a team of 8 teaching assistants and 70 students for a month-long intensive program using R

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Philadelphia Union, Philadelphia, PA **August 2022 – August 2023**
Data Analyst

- Created visualizations of player and ball movement to improve player decision-making
- Constructed models to analyze player tracking data and evaluate player and team performance

TALKS AND PRESENTATIONS

A series of four presentations on Random Binary Sequences
Computability Learning Seminar, University of Waterloo (October - November 2025)

Formalizing Turing Degrees in Lean
Logic Seminar, University of Waterloo (September 2025)

Too HoTT to Handle: The Importance of Homotopy Type Theory in Mathematics and Computer Science
Logic Seminar, University of Pennsylvania (May 2025)

AI and Unit Distance Graphs
Joint Mathematics Meetings, Seattle, WA (January 2025)

Developing a Mechanized Denotational Semantics for IMP
Summer Research Poster Exposition, University of Pennsylvania (September 2024)

Developing a Mechanized Denotational Semantics for IMP
Research Experience in Programming Languages, University of Pennsylvania (August 2024)

Shapley Values and A Game Theoretic Evaluation of Escape Rooms
Directed Reading Program, University of Pennsylvania (December 2023)

Model Theory: A Ballad of Categoricity, Completeness, and Algebraically Closed Fields
Directed Reading Program, University of Pennsylvania (May 2023)

ADDITIONAL INFORMATION

Language Skills: Lean; Coq; OCaml; Python; Java; Excel; R; Hebrew (conversational)
Interests: Interfaith Dialogue; KenKen Puzzles; Theology; Sports Analytics

RELEVANT COURSEWORK

Mathematics (University of Pennsylvania)

Calculus II: A-
Calculus III: A
Abstract Algebra I: A-
Abstract Algebra II: A
Supervised Study in Computability Theory: A
Supervised Study in Verifying Computability Theory in Lean: A
Graduate Analysis: A
Logic and Computability I: A
Logic and Computability II: A
Topics in Computability Theory: A

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Independent Study in Model Theory (Directed Reading Program): Pass
Independent Study in Game Theory (Directed Reading Program): Pass

Mathematics (Budapest Semester in Mathematics)

Research in AI and Unit Distance Graphs: A+
Conjecture and Proof: A
Advanced Combinatorics: A-

Computer and Information Science (University of Pennsylvania)

Programming Languages and Techniques I: A
Programming Languages and Techniques II: B-
Mathematical Foundations of Computer Science: A
Automata, Computability, and Complexity: A
Data Structures and Algorithms: A-
Independent Study Homotopy Type Theory: A