

# Luc D. Ta

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## EDUCATION

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### Yale University

New Haven, CT

B.A. Mathematics (intensive track with thesis) & Ethnicity, Race, and Migration; GPA: 3.8 Aug 2021 – May 2025

- **Senior thesis advisor:** Sam Raskin
- **Graduate coursework:** Representation Theory (spring 2025), Algebraic Topology (current), Quantum Invariants of Knots and 3-Manifolds (current), Algebra (grade: A)

### Budapest Semesters in Mathematics

Budapest, Hungary

Study abroad, facilitated by St. Olaf College

Jun 2023 – Aug 2023

- **Coursework:** Graph Theory (grade: A+), Advanced Combinatorics (grade: A)

## RESEARCH INTERESTS

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- **Primary:** Algebraic geometry, Lie theory, geometric group theory
- **Secondary:** Algebraic and categorical approaches to smooth knot theory and geometric topology

## RESEARCH EXPERIENCE

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### REU: Research Challenges of Computational Methods in Discrete Mathematics

Bethlehem, PA

Moravian University, Department of Mathematics

May 2024 – Jul 2024

- **Supervisors:** Samantha Pezzimenti (Penn State Brandywine) and Wing Hong Tony Wong (Kutztown University)
- Conducted [1] and [2] using methods from topology, knot theory, algebra, and combinatorics and Python algorithms
- Answered three open problems concerning mosaic numbers of Legendrian knots and toric mosaic numbers of knots
- Organized, prepared, and delivered weekly presentations about in-progress work to all REU participants and mentors

## PUBLICATIONS

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### RESEARCH ARTICLES

- [1] Margaret Kipe, Samantha Pezzimenti, Leif Schaumann, Luc Ta, and Wing Hong Tony Wong. *Bounds on the mosaic number of Legendrian knots*. 2024+. Preprint, [arXiv:2024.08064](https://arxiv.org/abs/2024.08064) [math.GT].
- [2] Kendall Heiney, Margaret Kipe, Samantha Pezzimenti, Kaelyn Pontes, and Luc Ta. *Constructions of and bounds on the toric mosaic number*. 2024+. In preparation.

### EDITOR-REVIEWED PUBLICATIONS

- [3] Luc Ta. Integer sequences “[A375353](#),” “[A375355](#),” “[A375356](#),” “[A375357](#),” “[A375392](#),” and “[A375619](#)” related to knot mosaics, hyperbolic links, and extremal graphs. *On-Line Encyclopedia of Integer Sequences (OEIS)*, 2024.
- [4] Margaret Kipe, Samantha Pezzimenti, Leif Schaumann, Luc Ta, and Wing Hong Tony Wong. Integer sequences “[A374939](#),” “[A374942](#),” “[A374943](#),” “[A374944](#),” “[A374945](#),” “[A374946](#),” “[A374947](#),” and “[A375354](#)” related to Legendrian knot mosaics as detailed in [1]. *On-Line Encyclopedia of Integer Sequences (OEIS)*, 2024.

## ADDITIONAL ACADEMIC EXPERIENCE

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### Independent Study of Lie Theory

Yale University, Department of Mathematics

New Haven, CT

Jan 2023 – May 2023

- **Advisor:** Andrew Neitzke
- Organized weekly readings, meetings, and discussions of Stillwell's *Naive Lie Theory* and Hall's *Lie Groups, Lie Algebras, and Representations* for a group of six undergraduates from the mathematics and physics departments
- Produced and presented an original final report classifying all (semi)simple complex Lie algebras using the Dynkin diagrams corresponding to irreducible root systems over  $\mathbb{C}$ , supplemented with original figures and examples

### Directed Project on Commutative Algebra

Polymath, Jr. Undergraduate Research Program

Remote

Jun 2022 – Aug 2022

- **Advisor:** Ananthnarayan Hariharan (Indian Institute of Technology, Bombay)
- Collaborated with three other undergraduates on a research-style directed study of commutative algebra with applications to algebraic number theory

### Science, Technology, and Research Scholars (STARS) Program

Yale University, Science & Quantitative Reasoning Center

New Haven, CT

Aug 2021 – May 2022

- Chosen by committee approval for highly selective, departmentally funded program to study research practices, technical writing, and other professional skills requisite for careers in academia and research in the sciences

## PRESENTATIONS

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### Computing the Mosaic Numbers of Legendrian Knots

Joint Mathematical Meetings, [Spectra Special Session on Research by LGBTQ+ Mathematicians](#)

Seattle, WA

Jan 2025

### Thrown for a Loop: A Survey of Knot Theory (Expository seminar & research talk)

Pizza Seminar Series, Yale Undergraduate Mathematics Society, Yale University

New Haven, CT

Sep 2024

### Toric Knot Mosaics (Contributed talk; joint with Kendall Heiney)

[UnKnot V Conference](#), Seattle University, Department of Mathematics

Seattle, WA

Jul 2024

### Legendrian Knot Mosaics (Invited talk; joint with Margaret Kipe & Leif Schaumann)

REU Symposium, Gettysburg College, Department of Mathematics

Gettysburg, PA

Jun 2024

## TEACHING

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### Introduction to Abstract Algebra

Undergraduate Learning Assistant

Yale University

Aug 2024 – Dec 2024

### Analysis II: Lebesgue Integration & Complex Fourier Series

Undergraduate Learning Assistant

Yale University

Jan 2024 – May 2024

- Created and distributed original [midterm](#) and [final exam](#) review problems and worksheets; designed and conducted multiple interactive exam review sessions and collected student feedback throughout the term; held regular office hours
- Served as the only on-campus ULA for all 40 students; wrote and provided solution sets to assist the off-campus ULA

### Real Analysis

Undergraduate Learning Assistant

Yale University

Aug 2023 – Dec 2023

- Designed and led weekly proof-writing workshops to introduce 44 students to set-theoretic concepts, proof techniques, and mathematical writing; conducted interactive midterm and final exam review sessions; held regular office hours

### Introduction to Functions & Calculus I-II

Undergraduate Learning Assistant & Peer Tutor

Yale University

Aug 2022 – May 2023

- Designed and led semiweekly interactive practice workshops; organized and conducted weekly small-group review sessions; created original practice problems for all 88 students and solution sets for other ULA's to consult during workshops

## EMPLOYMENT

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### **Web Developer & Office Assistant**

Yale University Bands

New Haven, CT

Aug 2023 – present

- Apply HTML, CSS, and JavaScript to oversee web development and upkeep for Yale’s concert, jazz, and marching bands

### **Undergraduate Learning Assistant**

Yale University, Department of Mathematics

New Haven, CT

Aug 2022 – present

- Hired after a highly selective interview and teaching evaluation process with mathematics faculty
- For further information, please refer to the “Teaching” section above.

### **Mathematics Tutor**

Self-employed

New Haven, CT & remote

Aug 2021 – present

- Work one-on-one with students of all ages to develop and reinforce mathematical confidence, review material for courses and standardized testing, and nurture mathematical curiosity by exploring connections to higher mathematics

### **Event Assistant**

“Crossroads of Algebra, Geometry, and Physics” Conference at Yale University

New Haven, CT

May 2022

- Worked alongside mathematics faculty and staff to facilitate and usher for a Yale mathematics conference
- Took advantage of the opportunity to attend presentations and explore algebraic geometry as a future research interest

## EXTRACURRICULAR & VOLUNTEER EXPERIENCE

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### **Delegate, Student Advisory Committee**

Yale University, Department of Mathematics

New Haven, CT

Feb 2024 – present

- Plan, organize, and secure funding for panel and roundtable discussions, mentorship opportunities, and partnerships with affinity groups to bridge the gap between students and faculty, turning students’ feedback into concrete policies
- Elected by students across mathematics-related majors to represent students’ diverse needs and voices in the department
- Advocate in particular for the needs of first-generation and marginalized students at biweekly meetings

### **Undergraduate Peer Mentor**

Yale Undergraduate Mathematics Society

New Haven, CT

Aug 2023 – present

- Mentor first-year students interested in studying mathematics, especially other first-generation students
- Engage with Yale’s broader mathematics community through various events, seminars, and presentations

### **Mathematics Advisor, Academic Fair**

Yale University, Department of Mathematics

New Haven, CT

Aug 2023 & Aug 2024

- Introduced incoming students to Yale’s mathematics department, answering questions about courses and the major

### **Cofounder & Vice Chair, Yale Students for Ranked-Choice Voting**

Yale University

New Haven, CT

Aug 2022 – present

- Lead and mentor students interested in statistical and combinatorial research on ranked-choice voting in New Haven

## WORKSHOPS

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### **Mathematics Graduate School Panel (Organized)**

Yale University, Department of Mathematics

New Haven, CT

Apr 2024

### **Departmental Town Hall (Organized & led)**

Yale University, Department of Mathematics

New Haven, CT

Apr 2024

- Secured departmental funding to plan, organize, and lead discussions at a session open for all students to provide feedback for the department, especially regarding its inclusivity, climate, and potential structural reforms
- Compiled a report of students’ experiences and critiques to share with the Dean of Undergraduate Studies in Mathematics

**Mathematics Course Scheduling & Major Planning Workshop** (Organized & hosted)  
Yale University, Department of Mathematics

New Haven, CT  
Apr 2024

## HONORS & GRANTS

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**Prospective Ph.D. Preview Program Scholar** (6% acceptance rate) Aug 2024  
Princeton University, Graduate School Deans and Administration

**Delta Alpha Pi Honor Society** (Founding member) Jan 2023 – present  
Yale University

**Richter Summer Fellowship** (\$1,500) Jun 2023  
Paul K. Richter and Evalyn E. Cook Richter Memorial Fund

**International Study Award** (\$3,400) Jun 2023  
Yale University

**Summer Experience Award** (\$4,000) May 2022  
Yale University

**Winston T. Townsend Prize for Excellence in English Composition** (\$1,000) May 2022  
Yale University, Department of English

## PROFESSIONAL MEMBERSHIPS & AFFILIATIONS

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- Association on Higher Education and Disability (AHEAD)
- Center for Minorities in the Mathematical Sciences (CMMS)
- Out in Science, Technology, Engineering, and Mathematics (oSTEM)
- Sines of Disability
- Spectra, the Association for LGBTQ+ Mathematicians

## SKILLS

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- **Programming languages:** Python, Java, R, HTML, CSS, JavaScript, Wolfram Language
- **Other software:**  $\text{\LaTeX}$ , PGF/TikZ, Mathematica, Singular, KnotPlot, Jupyter Notebook, Git, Logger Pro, Adobe Creative Cloud
- **Human languages:** American Sign Language (conversational), Spanish (conversational), Italian (reading)