

# 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

Aug 2021 – May 2025

- **Senior thesis advisor:** Prof. Sam Raskin
- **Selected coursework:** Graduate Algebraic Topology (current); Graduate Representation Theory (spring); Graduate Algebra (A); Intro to Algebraic Geometry (B+); Fields & Galois Theory (A-); Independent Study of Lie Theory (Pass)

### Budapest Semesters in Mathematics

Budapest, Hungary

Study abroad, Alfréd Rényi Institute of Mathematics & McDaniel College

Jun 2023 – Aug 2023

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

## RESEARCH INTERESTS

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- **Primary:** Algebraic geometry, Lie theory, geometric group theory, categorical methods
- **Secondary:** Algebraic and geometric methods in knot theory, graph theory, and voting theory and electoral redistricting

## RESEARCH EXPERIENCE

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

Bethlehem, PA

NSF Award #2150299 (\$5,940); Moravian University, Department of Mathematics

May 2024 – Jul 2024

- **Advisors:** Profs. Samantha Pezzimenti (Pennsylvania State University) & Tony W. H. Wong (Kutztown University)
- Conduct two research projects studying mosaics of knots embedded onto the surfaces of tori in  $\mathbb{R}^3$  and the effects of stabilization on the mosaic numbers of Legendrian knots using topology, combinatorics, algorithms, and data analysis
- Typeset and deliver weekly presentations about in-progress work to all REU participants and mentors
- Will deliver a contributed talk about in-progress work at UnKnot V, a conference at Seattle University, in July 2024

## ADDITIONAL ACADEMIC EXPERIENCE

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### Independent Study of Lie Theory

New Haven, CT

Yale University, Department of Mathematics

Jan 2023 – May 2023

- 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 students under the supervision of Prof. Andrew Neitzke (Yale University)
- Produced and presented an original final paper 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

Remote

Polymath, Jr. Undergraduate Research Program

Jun 2022 – Aug 2022

- Collaborated with three other undergraduates under the supervision of Prof. Ananthnarayan Hariharan (Indian Institute of Technology) on a research-style directed study of commutative rings and applications to algebraic number theory

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

New Haven, CT

Yale University, Science & Quantitative Reasoning Center

Aug 2021 – May 2022

- Engaged with professors and students from a wide range of STEM fields to study research practices, technical writing, and other professional skills requisite for research in the sciences and careers in academia
- Chosen by committee approval for this highly selective, departmentally funded program for first-year undergraduates demonstrating motivation, interest, and potential in mathematics and science research

## TEACHING

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### Yale University, Department of Mathematics

#### **Introduction to Abstract Algebra**

Undergraduate Teaching Assistant

New Haven, CT

Aug 2024 – Dec 2024

- Will serve as a TA for Yale’s notoriously difficult course in finite group theory and ring theory using Dummit and Foote’s *Abstract Algebra*

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

Undergraduate Teaching Assistant

New Haven, CT

Jan 2024 – May 2024

- Held semiweekly office hours to guide students on homework and general concepts in measure theory and Fourier analysis from Bass’s *Real Analysis for Graduate Students* and Beals’s *Analysis: An Introduction*
- Created and distributed original [midterm](#) and [final exam](#) review problems and worksheets; designed and conducted interactive exam review sessions
- Served as the only on-campus TA for all 40 students; wrote and provided solution sets for the off-campus TA to consult

#### **Real Analysis**

Undergraduate Teaching Assistant

New Haven, CT

Aug 2023 – Dec 2023

- Held semiweekly office hours and conducted interactive midterm and final exam review sessions to guide students on homework and general concepts from *Rudin’s Principles of Mathematical Analysis* and Tao’s *Analysis I*
- Designed and led weekly proof-writing workshops to introduce all 44 students to set theory and mathematical argument, developing confidence with proof techniques like epsilon-delta manipulation and mathematical induction

#### **Introduction to Functions & Calculus I-II**

Undergraduate Teaching Assistant & Peer Tutor

New Haven, CT

Aug 2022 – May 2023

- Designed and led semiweekly interactive practice workshops, held semiweekly office hours, and conducted weekly small-group review sessions to guide 80 students on general concepts and homework
- Created original practice problems and solution sets for other TA’s to deliver and consult during semiweekly workshops; formulated and refined teaching strategies and approaches with coworkers and course instructors

## PRESENTATIONS & WORKSHOPS

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#### **Toric Knot Mosaics & Torus Knots** (working title)

UnKnot V Conference, Seattle University, Department of Mathematics

Seattle, WA

Jul 2024

- Scheduled to deliver a contributed talk covering in-progress research from the REU at Moravian University
- Awarded travel and housing funding by conference organizers

#### **Mosaic Numbers of Legendrian Knots** (working title)

Gettysburg College, Department of Mathematics

Gettysburg, PA

Jun 2024

- Scheduled to deliver a talk covering in-progress research from the REU at Moravian University

#### **Applying to Mathematics Graduate School Panel**

Yale University, Department of Mathematics (**Organized**)

New Haven, CT

Apr 2024

- Secured departmental funding to plan, organize, and advertise a professional development panel and Q&A session with recent alumni for students from all departments considering applying to mathematics graduate school in the future

#### **Departmental Town Hall & Experiences Roundtable**

Yale University, Department of Mathematics (**Organized and led**)

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 and typeset an exhaustive list of students’ experiences and critiques; shared with the Dean of Undergraduate Studies in mathematics and will meet in the fall to discuss further action and potential improvements to the department

#### **Mathematics Course Scheduling & Major Planning Workshop**

Yale University, Department of Mathematics (**Organized and hosted**)

New Haven, CT

Apr 2024

- Secured departmental funding to plan, organize, and advertise a workshop for all students considering declaring or adding a major in mathematics; advised students 1-on-1 about selecting mathematics courses and fulfilling major requirements
- Compiled, typeset, and distributed an exhaustive list of mathematics course sequences (e.g., the abstract algebra and real analysis sequences) and recommendations for student use, in response to student feedback about major confusion

## EMPLOYMENT & PROFESSIONAL EXPERIENCE

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### Undergraduate Teaching Assistant

Yale University, Department of Mathematics

New Haven, CT

Aug 2022 – present

- Hold semiweekly office hours, design and typeset original review materials, and conduct interactive review sessions
- Hired after a highly selective interview and teaching evaluation process with mathematics faculty
- For further information, please refer to the “Teaching” section on page 2.

### Mathematics Tutor

Self-employed

Remote

Aug 2021 – present

- Work one-on-one with various high school students to develop and reinforce mathematical confidence, review course material, and explore connections to higher mathematics to nurture mathematical curiosity

### Office Assistant

Yale University, Department of Music

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

### 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
- Attended various talks to explore algebraic geometry as a future research interest

## LEADERSHIP

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### Delegate, Student Advisory Council

Yale University, Department of Mathematics

New Haven, CT

Feb 2024 – present

- Meet regularly with department staff to bridge the gap between students and faculty and help make the department a better place through concrete policies and changes, including discussion groups about mathematics and racial equity, DEI efforts and programs, partnerships with STEM affinity groups around campus, and student mentorship opportunities
- Advocate in particular for fellow first-generation, LGBTQ+, and underrepresented mathematics students
- Elected by fellow majors in pure mathematics, mathematics and physics, mathematics and economics, and mathematics and philosophy to represent students’ diverse needs and voices in the department

### Vice President & Founding Member, Yale Students for Ranked-Choice Voting

Yale University

New Haven, CT

Aug 2022 – present

- Lead and mentor a team of students interested in statistical research on ranked-choice voting and its hopeful implementation in the city of New Haven, nurturing their interest in combinatorics, probability theory, and voting theory

## SERVICE & COMMUNITY INVOLVEMENT

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### Undergraduate Peer Mentor

Yale Undergraduate Mathematics Society

New Haven, CT

Aug 2023 – present

- Serve as mentor for three first-year undergraduates interested in studying mathematics, with a special interest in mentoring fellow first-generation college students
- Engage with Yale’s broader mathematics community through various events, seminars, and talks

### Academic Fair Advisor

Yale University, Department of Mathematics

New Haven, CT

Aug 2023

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

## **Undergraduate Representative, Mathematics for Humans Reading Group**

Yale University, Department of Mathematics

New Haven, CT

Aug 2021 – present

- Promote diversity, equity, and inclusion in departmentally funded program with mathematics faculty and graduate students, investigating what it means to do mathematics and be a mathematician
- Advocate in particular for fellow first-generation, LGBTQ+, and underrepresented mathematics students

## **HONORS & FELLOWSHIPS**

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### **Delta Alpha Pi Honor Society**

Jan 2023 – present

Founding Member, Yale University Chapter

- Helped to found Yale's chapter of DAPi, an international honor society for high-achieving students with disabilities, having an emphasis on scholarship, service, and community
- Selected to represent the inaugural chapter by consensus across Yale faculty

### **Richter Summer Fellowship** (\$1,500)

Jun 2023 – Aug 2023

Paul K. Richter and Evalyn E. Cook Richter Memorial Fund

### **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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- Center for Minorities in the Mathematical Sciences (CMMS)
- Spectra, the Association for LGBTQ+ Mathematicians
- Out in Science, Technology, Engineering, and Mathematics (oSTEM)
- Sines of Disability
- Institute for the Quantitative Study of Inclusion, Diversity, and Equity (QSIDE)

## **SKILLS**

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- **Programming languages:** Python, Java, R, HTML, CSS, JavaScript
- **Other computing software:**  $\text{\LaTeX}$ , TikZ, Mathematica, Git, Adobe Creative Cloud
- **Human languages:** American Sign Language, Spanish, Italian (reading only)