Luc D. Ta

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Education

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 & St. Olaf College — Jun 2023 – Aug 2023

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

Research Interests

- **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

REU Site: Research Challenges of Computational Methods in Discrete Mathematics — Bethlehem, PA
NSF Award #2150299 ($5,940 stipend); 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 constructing and proving bounds for mosaic projections of Legendrian knots and torus knots using methods from topology, skein theory, and combinatorics, along with Python algorithms and data analysis
- Organize, typeset, and deliver weekly team presentations about in-progress work to all participants and mentors at the REU programs at Moravian University, Gettysburg College, and Lafayette College
- Will deliver a contributed talk about in-progress work at UnKnot V, a conference at Seattle University, in July 2024

Additional Academic Experience

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 algebra with 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

Introduction to Abstract Algebra — Yale University
Undergraduate Teaching Assistant — Aug 2024 – Dec 2024

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

Analysis II: Lebesgue Integration & Complex Fourier Series — Yale University
Undergraduate Teaching Assistant — Jan 2024 – May 2024

- Held regular office hours to guide students on homework, concepts, and methods in measure theory and Fourier analysis
- 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 semester
- 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 — Yale University
Undergraduate Teaching Assistant — Aug 2023 – Dec 2023

- Held regular office hours and conducted interactive midterm and final exam review sessions to guide students on homework, concepts, and methods 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 — Yale University
Undergraduate Teaching Assistant & Peer Tutor — Aug 2022 – May 2023

- Designed and led semiweekly interactive practice workshops and held regular office hours both independently and alongside other TA's for 80 students; organized and conducted weekly small-group review sessions for struggling students
- 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

Employment

Office Assistant — New Haven, CT
Yale University, Department of Music — Aug 2023 – present

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

Undergraduate Teaching Assistant — New Haven, CT
Yale University, Department of Mathematics — Aug 2022 – present

- Hold regular office hours, design and distribute 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 — Remote
Self-employed — Aug 2021 – present

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

Event Assistant — New Haven, CT
"Crossroads of Algebra, Geometry, and Physics" Conference at Yale University — 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

Delegate, Student Advisory Council — New Haven, CT
Yale University, Department of Mathematics — 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 as well as joint majors in mathematics and physics, mathematics and economics, and mathematics and philosophy to represent students' diverse needs and voices in the department

Undergraduate Peer Mentor New Haven, CT
Yale Undergraduate Mathematics Society 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 presentations

Academic Fair Advisor New Haven, CT
Yale University, Department of Mathematics Aug 2023

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

Vice President & Founding Member, Yale Students for Ranked-Choice Voting New Haven, CT
Yale University 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

Undergraduate Representative, Mathematics for Humans Reading Group New Haven, CT
Yale University, Department of Mathematics 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

Presentations

Toric Knot Mosaics & Torus Knots (working title) Seattle, WA
UnKnot V Conference, Seattle University, Department of Mathematics Jul 2024 (scheduled)

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

– Awarded travel and housing funding by conference organizers

Toric Knot Mosaics & Torus Knots (working title) Easton, PA
Lafayette College Jul 2024 (scheduled)

Legendrian Knot Mosaics Gettysburg, PA
Gettysburg College Jun 2024

– Prepared and delivered a talk covering in-progress research from the REU at Moravian University

Workshops

Applying to Mathematics Graduate School Panel New Haven, CT
Yale University, Department of Mathematics **(Organized)** 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 New Haven, CT
Yale University, Department of Mathematics **(Organized and led)** 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 New Haven, CT
Yale University, Department of Mathematics **(Organized and hosted)** 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 academic recommendations to students, in response to student feedback about major confusion

Honors & Fellowships

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

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

Skills

- **Programming languages:** Python, Java, R, HTML, CSS, JavaScript
- **Other computing software:** LaTeX, Ti*k*Z, Mathematica, Singular, Jupyter Notebook, Git, Adobe Creative Cloud
- **Human languages:** American Sign Language (conversational), Spanish (conversational), Italian (reading only)