Lực Đinh-Khương Ta

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Education

University of Pittsburgh — Pittsburgh, PA
Mathematics Ph.D. student, Kenneth P. Dietrich School of Arts and Sciences — 2025–present

- **Selected coursework:** Homological Algebra (A+), Affine Group Schemes (A), Complex Algebraic Geometry (A), Introduction to Langlands (A), Algebraic Topology (A), Symplectic Geometry (ongoing), Differential Geometry (ongoing)

Yale University — New Haven, CT
B.A. Mathematics (intensive track) & Ethnicity, Race, and Migration; GPA: 3.82 — 2021–2025

- **Graduate coursework:** Representation Theory, Flavors of Hyperbolicity in Geometric Group Theory, Commutative Algebra and Category Theory, Algebraic Topology, Quantum Invariants of Knots and 3-Manifolds
- Conducted bachelor's thesis research advised by Prof. Sam Raskin; see [6]

Budapest Semesters in Mathematics — Budapest, Hungary
Study abroad; GPA: 4.0 — 2023

Publications

Preprints

[1] *On medial Latin quandles and affine modules.* arXiv:2602.08875, 2026. 10 pages.

[2] *From affine algebraic racks to Leibniz algebras.* arXiv:2512.15909, 2025. 24 pages.

[3] *Distinguishing power of 4-Legendrian permutation racks,* with Peyton Phinehas Wood. arXiv:2510.26619, 2025. 13 pages.

[4] *Groups versus quandle-like invariants of 3-manifolds.* arXiv:2509.24098, 2025. 11 pages. Submitted.

[5] *Good involutions of conjugation subquandles.* arXiv:2505.08090, 2025. 32 pages. Submitted.

[6] *Classification and structure of generalized Legendrian racks.* arXiv:2504.12671, 2025. 29 pages. Submitted.

Peer-Reviewed Articles

[8] *Good involutions of twisted conjugation subquandles and Alexander quandles.* To appear in Comm. Algebra, doi:10.1080/00927872.2026.2643415. 18 pages. (Preprint available on arXiv.)

[9] *Graph quandles: Generalized Cayley graphs of racks and right quasigroups.* To appear in J. Non-Associative Structures, doi:10.46298/jonas.17215, 2026. 25 pages. (Open access.)

[10] *Constructions of and bounds on the toric mosaic number,* with Kendall Heiney, Margaret Kipe, Samantha Pezzimenti, and Kaelyn Pontes. Topology Appl. **377** (2026), Paper No. 109657, doi:10.1016/j.topol.2025.109657. MR4981983. 17 pages. (Preprint available on arXiv.)

[11] *Enumeration of virtual quandles up to isomorphism.* J. Integer Seq. **28** (2025), no. 8, Article 25.8.4, https://cs.uwaterloo.ca/journals/JIS/VOL28/Ta/ta3.html. 11 pages. (Open access.)

[12] *Bounds on the mosaic number of Legendrian knots*, with Margaret Kipe, Samantha Pezzimenti, Leif Schaumann, and Tony W. H. Wong. J. Knot Theory Ramifications **34** (2025), no. 12, Paper No. 2550055, doi:10.1142/S0218216525500555. 52 pages. MR4966653. (Preprint available on arXiv.)

Editor-Reviewed Publications

[12] Integer sequences A383144–A383146, A383828–A383831, A385040–A385041, A386231–A386234, and A387317 related to various topics in group theory and nonassociative algebra (see [8–6]) and A375353–A375357, A375392, A375619, and A376155 related to combinatorics. *On-Line Encyclopedia of Integer Sequences (OEIS)*, 2025.

[13] Integer sequences A374939, A374942–A374947, and A375354 related to Legendrian knot mosaics (see [12]), with Margaret Kipe, Samantha Pezzimenti, Leif Schaumann, and Wing Hong Tony Wong. *On-Line Encyclopedia of Integer Sequences (OEIS)*, 2024.

Talks

From Affine Algebraic Racks to Leibniz Algebras and Yang–Baxter Operators — Online
Invited talk, European Non-Associative Algebra Seminar — 8/26

From Affine Algebraic Racks to Leibniz Algebras — Tampa, FL
Invited talk, University of South Florida, Geometry/Topology Seminar — 4/26

Legendrian Knots and Rack-Theoretic Coloring Invariants — Pittsburgh, PA
SIAM Conference PD25, Contributed Presentation Session 9 — 11/25

From Groups to Nonassociative Knot Invariants — Pittsburgh, PA
Graduate Student Seminar, University of Pittsburgh — 9/25

Why Knot? Algebraic Coloring Invariants of Legendrian Knots — New Haven, CT
Mellon Forum (general audience), Grace Hopper College, Yale University — 4/25

Generalized Legendrian Racks: Knot Coloring Invariants & Algebraic Classification — Schenectady, NY
Hudson River Undergraduate Mathematics Conference, Union College — 4/25

Computing the Mosaic Numbers of Legendrian Knots — Seattle, WA
Joint Mathematical Meetings, Spectra Special Session on Research by LGBTQ+ Mathematicians — 1/25

Thrown for a Loop: A Survey of Knot Theory (half expository, half research talk) — New Haven, CT
Pizza Seminar Series, Yale Undergraduate Mathematics Society, Yale University — 9/24

Toric Knot Mosaics (with Kendall Heiney) — Seattle, WA
UnKnot V Conference, Seattle University, Department of Mathematics — 7/24

Legendrian Knot Mosaics (with Margaret Kipe and Leif Schaumann) — Gettysburg, PA
REU Symposium, Gettysburg College, Department of Mathematics — 6/24

Teaching

Finite Group Theory: A Second Course — University of Pittsburgh
Mentor, Directed Reading Program — 1/26–5/26

– Developed an original syllabus using the book *Finite Group Theory* by I. Martin Isaacs

Lie Groups, Lie Algebras, and Representation Theory — University of Pittsburgh
Mentor, Directed Reading Program — 9/25–12/25

– Developed an original syllabus using the book *Lie Groups, Lie Algebras, and Representations* by Brian Hall

Preparation for Scientific Calculus — University of Pittsburgh
Substitute Teaching Assistant — 9/25

– Led semiweekly practice sessions and administered exams for 30 precalculus students

Fields and Galois Theory — Yale University
Undergraduate Learning Assistant — 1/25–5/25

– Served as one of two TAs for 22 students; held regular office hours, small group tutoring sessions, and review sessions; designed original exam review materials; held regular one-on-one tutoring sessions; graded assignments

Introduction to Abstract Algebra Yale University
Undergraduate Learning Assistant 8/24–12/24

– Served as one of two TAs for 41 students; held regular office hours and interactive exam review sessions; designed original exam review materials

Analysis II: Lebesgue Integration and Complex Fourier Series Yale University
Undergraduate Learning Assistant 1/24–5/24

– Created and distributed original exam review materials; 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 Yale University
Undergraduate Learning Assistant 8/23–12/23

– 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 and Calculus I-II Yale University
Undergraduate Learning Assistant and Peer Tutor 8/22–5/23

– 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

Web Developer New Haven, CT
Yale University Bands 8/23–5/25

– Applied HTML, CSS, and JavaScript to oversee web development for Yale's concert, jazz, and marching bands

Undergraduate Learning Assistant New Haven, CT
Yale University, Department of Mathematics 8/22–5/25

– 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 New Haven, CT and remote
Self-employed 8/21–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 New Haven, CT
"Crossroads of Algebra, Geometry, and Physics" Conference at Yale University 5/22

– 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

Service

Secretary, Graduate Student Organization Pittsburgh, PA
University of Pittsburgh, Department of Mathematics 9/25–present

– Elected to take notes at meetings, share meeting minutes with the department, maintain student resources for graduate students, and write monthly newsletters for the department

Organizer, Scheme Theory Reading Group Pittsburgh, PA
University of Pittsburgh, Department of Mathematics 9/25–5/26

– Organize weekly meetings to discuss the algebraic geometry book *The Rising Sea* by Ravi Vakil, advised by Prof. Roman Fedorov

Reviewer Remote
zbMATH Open 12/25–present

Session Chair Pittsburgh, PA
SIAM Conference PD25 9/25

– Selected to serve as chair for Contributed Presentation Session 9

Delegate, Student Advisory Committee New Haven, CT
Yale University, Department of Mathematics 2/24–4/25

– Elected by students across mathematics-related majors to bridge the gap between students and faculty

– Advocated in particular for the needs of first-generation and marginalized students at biweekly meetings

Undergraduate Peer Mentor New Haven, CT
Yale Undergraduate Mathematics Society 8/23–4/25

– 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 New Haven, CT
Yale University, Department of Mathematics 8/23, 8/24, 4/25

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

Cofounder and Vice Chair New Haven, CT
Yale Students for Ranked-Choice Voting 8/22–5/25

– Mentored students interested in statistical and combinatorial research on ranked-choice voting in New Haven

Additional Academic Experience

REU: Research Challenges of Computational Methods in Discrete Mathematics Bethlehem, PA
Moravian University, Department of Mathematics 5/24–7/24

– **Supervisors:** Profs. Samantha Pezzimenti (Widener University) and Wing Hong Tony Wong (Kutztown University)

– Conducted [10, 12] using methods from topology, knot theory, algebra, and combinatorics and Python algorithms

Independent Study of Lie Theory and Representation Theory New Haven, CT
Yale University, Department of Mathematics 1/23–5/23

– **Advisor:** Prof. Andrew Neitzke

Directed Project on Commutative Algebra Remote
Polymath, Jr. Undergraduate Research Program 6/22–8/22

– **Advisor:** Prof. Ananthnarayan Hariharan (Indian Institute of Technology, Bombay)

Science, Technology, and Research Scholars (STARS) Program New Haven, CT
Yale University, Science and Quantitative Reasoning Center 8/21–5/22

Workshops

Mathematics REU Panel (Invited panelist) New Haven, CT
Yale Undergraduate Mathematics Society, Yale University 1/24

Departmental Town Halls (Organized and led) New Haven, CT
Yale University, Department of Mathematics 4/24, 12/24

– Held discussions at two session open for all students to provide feedback for the department, especially regarding its climate and potential structural reforms

– Compiled a report of students' experiences and critiques to share with the Dean of Undergraduate Studies in Mathematics

Mathematics Career Panel (Organized, led) New Haven, CT
Yale University, Department of Mathematics 11/24

Mathematics Graduate School Panel (Organized) New Haven, CT
Yale University, Department of Mathematics 4/24

Mathematics Course Scheduling and Major Planning Workshop (Organized, hosted) New Haven, CT
Yale University, Department of Mathematics 4/24

Honors & Grants

K. Leroy Irvis Summer Research Fellowship 5/26
University of Pittsburgh, Office of the Provost

SREB-State Doctoral Scholar 9/25
Southern Regional Education Board

K. Leroy Irvis Fellowship 8/25
University of Pittsburgh, Office of the Provost

Prospective Ph.D. Preview Program Scholar (6% acceptance rate) 8/24
Princeton University, Graduate School Deans and Administration

Delta Alpha Pi Honor Society (Founding member of Yale chapter) 1/23–5/25
Yale University

Richter Summer Fellowship 6/23
Paul K. Richter and Evalyn E. Cook Richter Memorial Fund

International Study Award 6/23
Yale University

Summer Experience Award 5/22
Yale University

Winston T. Townsend Prize for Excellence in English Composition 5/22
Yale University, Department of English

Professional Memberships & Affiliations

- American Mathematical Society (AMS)
- 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

- **Programming languages:** Python, Java, R, HTML, CSS, JavaScript, Wolfram Language
- **Other software:** LaTeX, PGF/TikZ, GAP, Mathematica, Singular, KnotPlot, Jupyter Notebook, Git, Adobe Creative Cloud
- **Human languages:** American Sign Language (advanced), Spanish (intermediate), Vietnamese (conversational), Italian (reading only)