

Matt Larson

CONTACT INFORMATION

96 Mountain Avenue
Princeton, NJ USA 08540
Citizenship: United States

EMPLOYMENT

Institute for Advanced Study

Bourgain Fellow, 2024 – present

Princeton University

Associate Research Scholar, 2024 – present

EDUCATION

Stanford University

PhD in Mathematics, 2019 – 2024
Advisors: June Huh and Ravi Vakil

Yale University

M.S. in Mathematics, B.S. in Mathematics, 2015 – 2019
Honors: Phi Beta Kappa, *magna cum laude*, distinction in the major

RESEARCH PAPERS

Fine multidegrees, universal Gröbner bases, and matrix Schubert varieties (with D. Huang), preprint.

Determinants of Hodge-Riemann forms (with I. Novik and A. Stapledon), preprint.

Rigidity matroids and linear algebraic matroids with applications to matrix completion and tensor codes (with J. Brakensiek, M. Dhar, J. Gao, and S. Gopi), preprint.

Straightening laws for Chow rings of matroids, preprint.

Kapranov degrees (with J. Brakensiek, C. Eur, and S. Li), preprint.

Rank functions and invariants of delta-matroids, preprint.

The local motivic monodromy conjecture for simplicial nondegenerate singularities (with S. Payne and A. Stapledon), preprint.

The Bergman fan of a polymatroid (with C. Crowley, J. Huh, C. Simpson, and B. Wang), preprint.

K-theoretic positivity for matroids (with C. Eur). To appear in Alg. Geom.

K-classes of delta-matroids and equivariant localization (with C. Eur and H. Spink). To appear in Trans. Amer. Math. Soc.

Signed permutohedra, delta-matroids, and beyond (with C. Eur, A. Fink, and H. Spink), Proc. Lond. Math. Soc. 3 (2024). Paper No. e12592, 54pp.

Intersection theory of polymatroids (with C. Eur), Int. Math. Res. Not. IMRN. 5 (2024), 4207-4241.

K-rings of wonderful varieties and matroids (with S. Li, S. Payne, and N. Proudfoot), Adv. Math. 441 (2024). Paper No. 109554, 43pp.

Kazhdan–Lusztig polynomials of braid matroids (with L. Ferroni), Comm. Amer. Math. Soc. 4 (2024), 64–79.

Stellahedral geometry of matroids (with C. Eur and J. Huh), Forum Math. Pi 11 (2023). Paper No. e24, 48pp.

Resolutions of local face modules, functoriality, and vanishing of local h -vectors (with S. Payne and A. Stapledon), Algebr. Comb. 6 (2023), 1057–1072.

The Arakelov–Zhang pairing and Julia sets (with A. Bridy), Proc. Amer. Math. Soc. 149 (2021), 3699–3713.

Inverse problems for minimal complements and maximal supplements (with N. Alon and N. Kravitz), J. Number Theory 223 (2021), 307–324.

Unions of Random Trees and Applications (with A. James, D. Montealegre, and A. Salmon), Disc. Math. 344 (2021). Paper No. 112265, 13pp.

Power maps in finite groups, Integers 19 (2019). Paper No. A58, 15pp.

EXPOSITORY WORK *Combinatorial Hodge theory* (with C. Eur). To appear in Notices Amer. Math. Soc.

Theorem of the base (with R. Cheng, L. Ji, and N. Olander). *Stacks Project Expository Collection*, 163–193, London Math. Soc. Lecture Note Ser., 480, Cambridge Univ. Press (2022).

INVITED TALKS *Triangulations of spheres and determinants of Hodge–Riemann forms*, Combinatorics & Geometry BLT seminar, online. (December 2024)

Fine multidegrees and Gröbner degenerations, Algebra, geometry and combinatorics day, Ann Arbor. (November 2024)

Geometry of delta-matroids, Geometry of matroids, IAS. (October 2024)

K-theory of Bergman fans, Tropical geometry: Moduli spaces and matroids, Frankfurt. (October 2024)

Signed permutohedra, Rutgers discrete math seminar, New Brunswick. (September 2024)

Matrix completion and tensor codes, Georgia Tech algebra seminar, Atlanta. (September 2024)

The monodromy conjecture for simplicial nondegenerate singularities, Princeton algebraic geometry seminar, Princeton. (September 2024)

Augmented geometry of matroids, Arrangements, matroids and logarithmic vector fields, Oberwolfach. (June 2024)

Low rank matrix completion and tensor codes, University of Zagreb applied math sem-

inar, Zagreb. (June 2024)

The monodromy conjecture for simplicial nondegenerate singularities, SNU algebraic geometry seminar, Seoul. (March 2024)

Cross-ratio degrees, University of Minnesota combinatorics seminar, online. (January 2024)

Kapranov degrees, Joint Math Meetings, San Francisco. (January 2024)

Cross-ratio degrees, Harvard–MIT combinatorics seminar, Cambridge. (November 2023)

Cross-ratio degrees, University of Oregon algebra seminar, Eugene. (October 2023)

Signed permutohedra, Combinatorial algebraic geometry ICERM event, Providence. (August 2023)

The Kähler package for projective bundle rings, Workshop on Lefschetz properties, Toronto. (May 2023)

Signed permutohedra, San Francisco State University algebraic geometry seminar, San Francisco. (May 2023)

Bergman fans of polymatroids, Fields matroid seminar, online. (April 2023)

The K-ring of $\overline{M}_{0,n}$, University of Michigan algebraic geometry seminar, Ann Arbor. (March 2023)

Invariants of delta-matroids, Algebraic aspects of matroid theory, BIRS. (March 2023)

The K-ring of $\overline{M}_{0,n}$, Cambridge algebraic geometry seminar, Cambridge. (February 2023)

Stellahedral geometry of matroids, KTH combinatorics seminar, online. (November 2022)

The local motivic monodromy conjecture for simplicial nondegenerate singularities, Brown algebraic geometry seminar, Providence. (November 2022)

Algebraic geometry of delta-matroids, Matroids Day, Madison. (November 2022)

The local motivic monodromy conjecture for simplicial nondegenerate singularities, Stanford algebraic geometry seminar, Stanford. (October 2022)

Stellahedral geometry of matroids, University of Western Ontario geometry and combinatorics seminar, online. (October 2022)

Algebraic geometry of delta-matroids, Fall Eastern Sectional Meeting, Amherst. (October 2022)

Nonvanishing criteria for local h -polynomials, Fall South Sectional Meeting, El Paso. (September 2022)

TEACHING	Stanford University Spring 2020 Course assistant for Modules and Groups Representations Fall 2019 Course assistant for Applied Linear Algebra Yale University Fall 2017 - Spring 2019 Peer tutor for Vector Calculus and Linear Algebra I and II
HONORS AND AWARDS	2023 ARCS Fellowship 2020 NDSEG Fellowship 2019 DeForest Prize 2018 Chess International Master 2018 Anthony Stanley Prize 2017 Benjamin F. Barge Prize
SERVICE	Organizer of the IAS special year seminar (2024-2025) Stanford directed reading project mentor (2022-2024) Organizer of Stanford student algebraic geometry seminar (2020-2023) Contributor to the Stacks project Member of Yale math department's undergraduate student advisory committee (2018-2019) Reviewer for MathSciNet Referee for Adv. Math., Algebr. Comb., Comm. Amer. Math. Soc., Compos. Math., Discrete Comput. Geom., Discrete Math. Lett., Duke Math. J., Electron. J. Combin., Eur. J. Combin., Exp. Math., Forum. Math. Sigma, FPSAC, Int. Math. Res. Not. IMRN, J. Algebra, J. Symbolic Comput., Manuscripta Math., MATRIX Ann., Selecta Math.