Nathan Kaplan

Contact

University of California, Irvine
Department of Mathematics
540c Rowland Hall
Irvine, CA 92697

nckaplan@math.uci.edu
http://math.uci.edu/~nckaplan/
Citizenship: United States

Professional Positions

- **University of California, Irvine** 7/2015–Present
  - Professor of Mathematics (2024–Present). Irvine, CA
  - Associate Professor of Mathematics (2019–2024).
  - Assistant Professor of Mathematics (2015–2019).
- **Yale University** 7/2013–07/2015
  - Gibbs Assistant Professor of Mathematics. New Haven, CT

Visiting Positions

- **CUNY Graduate Center**, Visiting Research Scholar 10/2021–9/2022.

Research interests

- Number Theory, arithmetic algebraic geometry, coding theory, combinatorics.

Education

- **Harvard University** 9/2008–5/2013
  - Ph.D. in Mathematics, May 2013. Cambridge, MA
  - Advisor: Noam Elkies.
  - Thesis: *Rational Point Counts for del Pezzo Surfaces over Finite Fields and Coding Theory.*
- **Cambridge University** 9/2007–6/2008
  - C.A.S.M. Pure Mathematics (Part III) Cambridge, UK
- **Princeton University** 9/2003–6/2007
  - A.B. Mathematics Princeton, NJ

Publications

1. D. Bowles, S. Chapman, N. Kaplan, and D. Reiser, *On delta sets of numerical monoids*, J. Algebra Appl. 5 (2006), no. 5, 695-718. http://dx.doi.org/10.1142/S0219498806001958.

2. C. Erickson, N. Kaplan, N. Mendoza, A. Pacelli, and T. Shayler, *Parametrized families of quadratic number fields with 3-rank at least 2*, Acta Arith. 130 (2007), no. 2, 141-147. http://dx.doi.org/10.4064/aa130-2-3.

3. N. Kaplan, *Flat cyclotomic polynomials of order three*, J. Num. Theory 127 (2007), no. 1, 118-126. http://dx.doi.org/10.1016/j.jnt.2007.01.008.

4. N. Kaplan, *Bounds for the maximal height of divisors of $x^n - 1$*, J. Num. Theory 129 (2009), 2673-2688. http://dx.doi.org/10.1016/j.jnt.2009.04.015.

5. S. Chapman, R. Hoyer, and N. Kaplan, *Delta sets of numerical monoids are eventually periodic*, Aequationes Math. 77 (2009), no. 3, 273-279. http://dx.doi.org/10.1007/s00010-008-2948-4.

6. N. Kaplan, *Flat cyclotomic polynomials of order four and higher*, Integers 10 (2010), 357-363. `http://dx.doi.org/10.1515/INTEG.2010.030`.

7. S. Chapman, J. Daigle, R. Hoyer, and N. Kaplan. *Delta sets of numerical monoids using non-minimal sets of generators.* Comm. Algebra 38 (2010), no. 7, 2622-2634. `http://dx.doi.org/10.1080/00927870903045165`.

8. D. Anderson, S. Chapman, N. Kaplan, and D. Torkornoo. *An algorithm to compute ω-primality in a numerical monoid.* Semigroup Forum 82 (2011), no. 1, 96-108. `http://dx.doi.org/10.1007/s00233-010-9259-5`.

9. N. Kaplan, *Counting numerical semigroups by genus and some cases of a question of Wilf.* J. Pure Appl. Algebra 216 (2012), no. 5, 1016-1032. `http://dx.doi.org/10.1016/j.jpaa.2011.10.038`.

10. N. Kaplan and L. Ye, *The proportion of Weierstrass semigroups*, J. Algebra 373 (2013), 377-391. `http://dx.doi.org/10.1016/j.jalgebra.2012.09.041`.

11. N. Elkies and N. Kaplan, *Extended Abstract: An application of weighted theta functions to t-core partitions and numerical semigroups*, in Optimal and Near Optimal Configurations on Lattices and Manifolds, C. Bachoc, P. Grabner, E. Saff, and A. Schürmann eds., Oberwolfach Reports (2013), 2453-2456.

12. N. Kaplan, *Rational Point Counts for del Pezzo Surfaces over Finite Fields and Coding Theory.* Ph.D. Thesis, Harvard University, 2013. 203 pp. `https://www.math.uci.edu/~nckaplan/research_files/kaplanthesis.pdf`

13. S. Chapman, N. Kaplan, T. Lemburg, A. Niles, and C. Zlogar, *Shifts of generators and delta sets of numerical monoids*, Internat. J. Algebra Comput. (2014), no. 5, 655-669. `http://dx.doi.org/10.1142/S0218196714500271`.

14. N. Kaplan, *MacWilliams identities for m-tuple weight enumerators.* SIAM J. Discrete Math. 28-1 (2014), 428-444. `http://dx.doi.org/10.1137/120876356`.

15. A. Bucur, C. David, B. Feigon, N. Kaplan, M. Lalín, E. Ozman, and M. Matchett Wood, *The distribution of $\mathbb{F}_q$-points on cyclic ℓ-covers of genus g.* Int. Math. Res. Not. IMRN (2016), no. 14, 4297-4340. `http://dx.doi.org/10.1093/imrn/rnv279`.

16. N. Kaplan, J. Marcinek, and R. Takloo-Bighash, *Distribution of orders in number fields.* Res. Math. Sci. **2** (2015), Art. 6, 57 pp. `http://dx.doi.org/10.1186/s40687-015-0027-8`.

17. J. Clancy, N. Kaplan, T. Leake, S. Payne, and M. Matchett Wood, *On a Cohen-Lenstra heuristic for Jacobians of random graphs.* J. Algebraic Combin. 42 (2015), no. 3, 701-723. `http://dx.doi.org/10.1007/s10801-015-0598-x`.

18. N. Kaplan and I. Petrow, *Traces of Hecke operators and refined weight enumerators of Reed-Solomon codes.* Trans. Amer. Math. Soc. 370 (2018), 2537-2561. `http://dx.doi.org/10.1090/tran/7089`.

19. H. Constantin, B. Houston-Edwards, and N. Kaplan, *Numerical sets, core partitions, and integer points in polytopes.* Combinatorial and Additive Number Theory. II, 99-127, Springer Proc. Math. Stat., 220, Springer, Cham, 2017. `https://doi.org/10.1007/978-3-319-68032-3_7`.

20. J. Balakrishnan, W. Ho, N. Kaplan, S. Spicer, W. Stein, and J. Weigandt, *Databases of elliptic curves ordered by height and distributions of Selmer groups and ranks.* LMS J. Comput. Math. 19 (2016), issue A, 351-370. `http://dx.doi.org/10.1112/S1461157016000152`.

21. S. Colton and N. Kaplan, *The realization problem for delta sets of numerical semigroups.* J. Commut. Algebra 9 (2017), no. 3, 313-339. `http://dx.doi.org/10.1216/JCA-2017-9-3-313`.

22. N. Kaplan and I. Petrow, *Elliptic curves over a finite field and the trace formula.* Proc. London Math. Soc., 115 (2017), 1317-1372. `http://dx.doi.org/10.1112/plms.12069`.

23. N. Kaplan, *Where should I open my restaurant?.* Math. Mag. 90 (2017), no. 4, 278-285. `http://dx.doi.org/10.4169/math.mag.90.4.278`.

24. N. Kaplan, *Counting numerical semigroups.* Amer. Math. Monthly 124 (2017), no. 9, 862-875. `http://www.jstor.org/stable/10.4169/amer.math.monthly.124.9.862`.

25. D. Short, N. Kaplan, and D. Narayan, *Flanking numbers and arankings of cyclic graphs.* J. Combin. Math. Combin. Comput. 99 (2016), 131-150. `https://combinatorialpress.com/jcmcc-articles/volume-099/flanking-mumbers-and-arankings-of-cyclic-graphs/`

26. S. Anderson, W. Halbawi, N. Kaplan, H. H. López, F. Manganiello, E. Soljanin, and J. Walker, *Representations of the multicast network problem.* Algebraic Geometry for Coding Theory and Cryptography– IPAM, Los Angeles, CA February 2016, Association for Women in Mathematics Series, 9, Springer, (2017), 1–23. `https://doi.org/10.1007/978-3-319-63931-4_1`.

27. N. Kaplan, S. Kimport, R. Lawrence, L. Peilen, and M. Weinreich, *Counting arcs in the projective plane via Glynn's algorithm.* J. Geom. 108 (2017), no. 3, 1013-1029. `http://dx.doi.org/10.1007/s00022-017-0391-1`.

28. B. Braun, H. Corrales, S. Corry, L. García Puente, D. Glass, N. Kaplan, J. Martin, G. Musiker, and C. Valencia, *Counting arithmetical structures on paths and cycles.* Discrete Math. 341 (2018), no. 10, 2949–2963. `https://doi.org/10.1016/j.disc.2018.07.002`.

29. N. Kaplan, *Weight enumerators of Reed-Muller codes from cubic curves and their duals.* Arithmetic Geometry: Computation and Applications, 59–77 Contemp. Math., 722, Amer. Math. Soc., Providence, RI, 2019. `https://doi.org/10.1090/conm/722/14535`

30. J. Fulman and N. Kaplan, *Random partitions and Cohen-Lenstra heuristics.* Ann. Comb. 23 (2019), no. 2, 295–315. `https://doi.org/10.1007/s00026-019-00425-y`

31. D. Glass and N. Kaplan, *Chip-firing games and critical groups. A Project-Based Guide to Undergraduate Research in Mathematics*, 107–152, Found. Undergrad. Res. Math., Birkhäuser, Cham, 2020. `https://doi.org/10.1007/978-3-030-37853-0_4`

32. S. Atanasov, N. Kaplan, B. Krakoff, and J. H. Menzel, *Counting finite index subrings of $\mathbb{Z}^n$.* Acta Arith. 197 (2021), no. 3, 221–246. `https://doi.org/10.4064/aa180201-29-7`.

33. N. Kaplan and V. Matei, *Counting plane cubic curves over finite fields with a prescribed number of rational intersection points.* Eur. J. Math. 7 (2021), 1137–1181. `https://doi.org/10.1007/s40879-021-00472-x`.

34. N. Kaplan and C. O'Neill, *Numerical semigroups, polyhedra, and posets I: the group cone.* Combinatorial Theory 1 (2021), #19. `https://doi.org/10.5070/C61055385`.

35. G. Cheong and N. Kaplan, *Generalizations of results of Friedman and Washington on cokernels of random p-adic matrices.* J. Algebra 604 (2022), 636–663.
`https://doi.org/10.1016/j.jalgebra.2022.03.035.`

36. G. Chinta, N. Kaplan, and S. Koplewitz, *The cotype zeta function of $\mathbb{Z}^d$.* Indag. Math. 34 (2023), 643–659. `https://doi.org/10.1016/j.indag.2023.01.003.`

37. N. Kaplan and D. Singhal, *The expected embedding dimension, type and weight of a numerical semigroup.* Enumer. Comb. Appl. 3 (2023), no. 2, Paper No. S2R14, 28 pp.
`https://doi.org/10.54550/ECA2023V3S2R14.`

38. J. Cullinan and N. Kaplan, *The probability of non-isomorphic group structures of isogenous elliptic curves in finite field extensions, I.* Res. Number Theory 9 (2023), Paper No. 57, 31 pp.
`https://doi.org/10.1007/s40993-023-00456-8.`

39. A. Chen, N. Kaplan, L. Lawson, C. O'Neill, and D. Singhal, *Enumerating numerical sets associated to a numerical semigroup.* Discrete Appl. Math. 341 (2023) 218–231.
`https://doi.org/10.1016/j.dam.2023.08.010.`

40. J. De Loera, L. Escobar, N. Kaplan and C. Wang, *Sums of weighted lattice points of polytopes.* 35th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2023), Sém. Lothar. Combin. 89B (2023), Article #17, 12 pp.

41. J. Cullinan, S. Dobson, L. Frey, A. Hamakiotes, R. Hernandez, N. Kaplan, J. Mello, and G. Scullard, *The probability of non-isomorphic group structures of isogenous elliptic curves in finite field extensions, II.* J. Num. Theory 266 (2025) 131–165.
`https://doi.org/10.1016/j.jnt.2024.07.013.`

42. N. Kaplan and J.-L. Kim, *Hulls of projective Reed-Muller codes.* Des. Codes Cryptogr. 93 (2025), no. 3, 683–699. `https://doi.org/10.1007/s10623-024-01543-2.`

43. N. Kaplan, K. Kim, C. McGeorge, F. Ramirez, and D. Singhal *On the smallest partition associated to a numerical semigroup.* To appear in Proceedings of the Conference on *The Ideal Theory and Arithmetic of Rings, Monoids, and Semigroups.* (2025) 23 pp.
`https://arxiv.org/abs/2507.04169.`

44. N. Kaplan and H. Polo, *A Goldbach theorem for Laurent series semidomains.* New York J. Math. 31 (2025) 1409–1426. `https://arxiv.org/abs/2312.14888.`

45. S. Cyrusian and N. Kaplan, *Ordinarization numbers of numerical semigroups.* Comm. Algebra (2026) 1–24. `https://doi.org/10.1080/00927872.2026.2615092.`

Preprints

1. E. Cotterill, N. Kaplan, and R. Vieira Costa, *Cusps in $\mathbb{C}^3$ with prescribed ramification.* Submitted (2024) 23 pp. `https://arxiv.org/abs/2303.09303.`

2. J. De Loera, L. Escobar, N. Kaplan and C. Wang, *Sums of weighted lattice points of polytopes.* Submitted (2024) 24 pp. `https://arxiv.org/abs/2402.11328.`

3. K. Isham and N. Kaplan with an appendix by G. Chinta, *Most subrings of $\mathbb{Z}^n$ have large corank.* Submitted (2024) 29 pp. `https://arxiv.org/abs/2412.18692.`

4. K. Isham, N. Kaplan, S. Kimport, R. Lawrence, L. Peilen, and M. Weinreich, *Configurations of* 10 *points and their incidence varieties.* Submitted (2025) 25 pp. https://arxiv.org/abs/2507.09829.

5. J. An, N. Kaplan, J.-L. Kim, J. Luo, and G. Wang, *Shortest self-orthogonal embeddings of binary linear codes.* Submitted (2025) 17 pp. https://arxiv.org/abs/2511.05440.

6. J. Cullinan and N. Kaplan, *The probability of isomorphic group structures of isogenous elliptic curves over finite fields.* Submitted (2025) 11 pp. https://arxiv.org/abs/2512.23921.

Grants

- PI for NSF Grant DMS 2154223 "Cokernels of Random Matrices and the Geometry of Error-Correcting Codes", 2022–2026.
- Simons Collaboration Grant, 2022. Recommended for funding. Declined to accept NSF Grant.
- PI for NSF Grant DMS 2009790 "Southern California Number Theory Day Conferences at UC Irvine", 2020-2025.
- PI for NSF Grant DMS 1802281 "Counting Problems in Number Theory: Elliptic and Plane Quartic Curves over Finite Fields", 2018-2022.
- Simons Collaboration Grant, 2018. Recommended for funding. Declined to accept NSF Grant.
- NSF Travel Grant to attend *Foundations of Computational Mathematics, 2017.*
- PI for NSF Grant "Southern California Number Theory Day Conferences at UC Irvine" with co-PI Alice Silverberg, 2016-2021.
- NSA Young Investigator Grant, 2016-2018.
- AMS-Simons Travel Grant, 2015-2017.
- National Science Foundation Graduate Research Fellowship, 2007-2010.

Editorial and Advisory Boards

- Springer Undergraduate Texts in Mathematics Advisory Board, 2021–Present.
- *American Mathematical Monthly* (Associate Editor), 2025–Present.
- *Semigroup Forum* (Communicating Editor), 2021–Present.
- *Involve*, 2021–Present.
- International advisory board for *International Coding Theory Seminar (ICTS)*, 2023–present.

Honors and awards

- *Indagationes Mathematicae* best paper award, Royal Dutch Mathematical Society, 2023.
- UCI Mathematics Outstanding Contributions to Undergraduate Education Award, 2022.
- UCI Mathematics Faculty Mentor Award, 2018.
- Certificate of Distinction in Teaching for EMR 14: Fat Chance, Fall 2010 and Spring 2011, and for Math Ma: Introduction to Functions and Calculus I, Fall 2012.
- Eric Cooper and Naomi Siegel Graduate Student Fellowship Fund I, 2011.
- AMS-MAA-SIAM Morgan Prize for Undergraduate Research, 2008.
- Peter A. Greenberg Memorial Prize for Excellence in Mathematics, Princeton, 2007.

Minicourse Talks

- IPAM, Algebraic Techniques for Combinatorial and Computational Geometry, Tutorials, March 2014. Two Lectures.

Colloquium Talks

- Virginia Tech, May 2026.
- University of Pittsburgh, September 2025.
- Cal State San Marcos, May 2024.
- University of Arizona, March 2024.
- Colorado State University, February 2021.
- USC, November 2019.
- Claremont Center for Mathematical Sciences, September 2016.
- University of Oregon, May 2016.
- USC, March 2016.
- San Diego State University, December 2015.
- IDA: CCR, La Jolla, CA, December 2015.
- CCNY, March 2015.
- UC Irvine, January 2015.
- CCNY, October 2014.
- IDA: CCR, Princeton, NJ, September 2012.
- Sam Houston State, Huntsville, TX, November 2008.
- Universität Bremen, Bremen, Germany, April 2008.

Seminar Talks

- Virginia Tech, Applied Algebra Seminar, April 2026.
- Rice University, Algebra Seminar, February 2026.
- University of Pittsburgh, Algebra, Combinatorics, and Geometry seminar, September 2025.
- Simple Words online seminar, December 2024.
- UCSB Seminar on Geometry and Arithmetic, October 2024.
- University of Arizona, Algebra and Number Theory seminar, March 2024.
- Claremont Center for the Mathematical Sciences, Algebra/Number Theory/Combinatorics Seminar, March 2024.
- University of Virginia Number Theory Seminar, September 2022.
- George Washington University Combinatorics Seminar, April 2022.
- University of Chicago No Boundaries Seminar, June 2021.
- Séminaire Arithmétique Théorie de L'Information, March 2021.
- New York Number Theory Seminar, January 2021.
- Algebraic Coding and Cryptography on the East Coast (ACCESS), October 2020.
- UCLA, Number Theory Seminar, November 2019.
- UC Irvine, Algorithms, Combinatorics, and Optimization Seminar, November 2018.
- University of Virginia, Algebra Seminar, April 2018.
- Emory University, Algebra Seminar, March 2018.
- USC, Algebra Seminar, September 2017.
- Rice University, Algebraic Geometry and Number Theory Seminar, September 2017.
- Claremont Center for the Mathematical Sciences, Algebra/Number Theory/Combinatorics Seminar, September 2017.
- CUNY, Number Theory Seminar, May 2017.
- Colorado State, Front Range Algebra, Geometry and Number Theory Seminar, March 2017.
- PIMS Explicit Methods in Abelian Varieties Multi-Site Seminar, March 2017.
- UCLA, Number Theory Seminar, March 2017.
- UCSD, Number Theory Seminar, March 2017.

- Tufts University, Algebra and Geometry Seminar, December 2016.
- Caltech, Combinatorics Seminar, October 2016.
- University of Oregon, Number Theory Seminar, May 2016.
- Claremont Center for the Mathematical Sciences, Algebra/Number Theory/Combinatorics Seminar, March 2016.
- Caltech, Number Theory Seminar, March 2016.
- University of Wisconsin, Number Theory Seminar, December 2015.
- UCLA, Combinatorics Seminar, November 2015.
- UC Irvine, Number Theory Seminar, April 2015.
- Rutgers University, Number Theory Seminar, March 2015.
- Rice, Algebraic Geometry and Number Theory Seminar, February 2015.
- Yale, Algebra and Number Theory Seminar, February 2015.
- University of Michigan, Group, Lie and Number Theory Seminar, December 2014.
- Wesleyan, Algebra Seminar, November 2014.
- EPFL, Lausanne, Switzerland, October 2014.
- Brown, Algebra Seminar, April 2014.
- CUNY, Collaborative Number Theory Seminar, February 2014.
- Williams, Faculty Seminar, November 2013.
- Quebec-Vermont Number Theory Seminar, McGill University, October 2013.
- Yale, Number Theory Seminar, October 2013.
- University of Connecticut, Algebra Seminar, February 2013.
- Boston University, Algebra Seminar, December 2012.
- Dartmouth College, Number Theory Seminar, November 2012.
- Yale, Number Theory Seminar, October 2012.
- Dartmouth College, Number Theory Seminar, October 2010.
- University of Illinois-Chicago, Number Theory Seminar, August 2009.

Conference Talks

- 17th International Symposium on Natural Sciences, October 2025.
- Joint Mathematics Meetings, January 2024.
  Two Talks: Special Session on Coding Theory for Modern Applications,
  Special Session on Ideal and Factorization Theory in Rings and Semigroups.
- International Conference on Coding Theory and its Applications, August 2023.
- Number Theory and Combinatorics in Duluth, University of Minnesota, Duluth. August 2023.
- International Meeting on Numerical Semigroups, Rome, Italy. June 2022.
- AMS Spring Western Sectional Meeting, May 2022.
  Special Session on Factorization and Arithmetic Properties of Commutative Rings and Monoids.
- 26th International Conference on Applications of Computer Algebra, July 2021.
  Session: Computer Algebra for Geometry and Combinatorics.
- CIRM, Arithmetic, Geometry, Cryptography and Coding Theory, June 2021.
- MAA Invited Address, Joint Mathematics Meetings, January 2021.
- Algebraic questions around Random Integral Matrices, Ohio State University, November 2020.
- Front Range Number Theory Day, University of Colorado, April 2019.
- AMS Spring Central and Western Joint Sectional Meeting, March 2019.
  Two Talks: Special Session on Emerging Connections in Number Theory, Special Session on Factorization and Arithmetic Properties of Integral Domains and Monoids.
- Hawaii Number Theory Conference, March 2019.
  Special Session on Arithmetic Statistics and its Environs.

- 3$^\text{rd}$ Southern California Discrete Mathematics Symposium, USC, May 2018.
- AMS/MAA Joint Mathematics Meeting, January 2018.
  Special Session on Accessible Problems in Modern Number Theory.
- Foundations of Computational Mathematics: Workshop on Computational Number Theory,
  July 2017.
- CIRM, Arithmetic, Geometry, Cryptography and Coding Theory, June 2017.
- AMS Spring Eastern Sectional Meeting, May 2017.
  Special Session on Finite Field and their Applications.
- AMS/MAA Joint Mathematics Meeting, January 2017.
  Special Session on Mathematics of Cryptography.
- Algebraic Techniques for Combinatorial and Computational Geometry Reunion Conference,
  December 2016.
- AMS Fall Central Sectional Meeting, October 2016.
  Special Session on Chip-Firing and Divisors on Graphs and Complexes
- AMS Fall Western Sectional Meeting, October 2015.
  Special Session on Recent Advances in Number Theory.
- Biannual Algebraic and Tropical Meetings of Brown and Yale, April 2015.
- AMS/MAA Joint Mathematics Meeting, January 2015. Two Talks: Special Session on
  Factorization Theory and Its Applications, Special Session on Advances in Coding Theory.
- CUNY, Combinatorial and Additive Number Theory, May 2014.
- Algebraic Techniques for Combinatorial and Computational Geometry, IPAM, UCLA,
  Workshop: "Finding Algebraic Structures in Extremal Combinatorial Configurations", May 2014.
- CUNY, Combinatorial and Additive Number Theory, May 2013.
- Atkin Memorial Lecture and Workshop: Cohen-Lenstra Heuristics,
  University of Illinois-Chicago, May 2013.
- AMS/MAA Joint Mathematics Meeting, January 2013.
  Special Session on Arithmetic and Ideal Theory of Integral Domains and Monoids.
- Oberwolfach, "Optimal and Near Optimal Configurations on Lattices and Manifolds", August 2012.
- CUNY, Combinatorial and Additive Number Theory, May 2012.
- CUNY, Combinatorial and Additive Number Theory, May 2011.
- AMS Sectional Meeting, NC State, April 2009. Special Session on Commutative Rings and
  Monoids.
- AMS/MAA Joint Mathematics Meeting, January 2009.
- Iberian Meeting on Numerical Semigroups, Porto, Portugal, March 2008.
- Communicating Mathematics: A Conference in Honor of the Thirtieth Anniversary of the Duluth
  REU, Duluth, MN, July 2007.
- AMS Sectional Meeting, Stevens Institute of Technology, Hoboken, NJ, April 2007.
  Special Session on Number Theory.
- AMS/MAA Joint Mathematics Meeting, January 2007.
- AMS/MAA Joint Mathematics Meeting, January 2006.
- MAA Mathfest, August 2005.
- Young Mathematicians Conference, Ohio State, June 2004.

Outreach Talks and Activities

- Bay Area Mathematical Adventures (BAMA), Santa Clara University, March 2026.
- The Euler Circle, Independent research and paper writing class for high school students, June 2024.
- Museum of Mathematics, New York, "Math Encounters", July 2022.

- New York City Discrete Math REU, July 2022.
- University of Illinois-Chicago Math Club, February 2022.
- University of Connecticut Math Club, October 2020.
- San Diego State University REU Program, July 2019.
- Plenary Lecture, Undergraduate Mathematics Symposium at University of Illinois-Chicago, November 2018.
- Southern California MathCounts Competition, February 2018 and March 2016.
- UCI Math Circle, January and March 2020, January 2018 and October 2016.
- Judge for AMS/MAA Joint Meetings Undergraduate Poster Session, 2017, 2018.
- Mathematical Consultant for *Infinite Series: Higher-Dimensional Tic-Tac-Toe*, PBS Digital Studios, September 2017.
- San Diego State University REU Program, August 2017.
- Algebraic Techniques for Combinatorial and Computational Geometry Reunion Conference, Evening Talk for participants from all research programs, December 2016.
- Yale University, SUMRY Undergraduate Research Program Colloquium, June 2016.
- UC Irvine, The Man Who Knew Infinity- Panel Discussion and Q&A, May 2016.
- UC Irvine, Undergraduate Pizza Seminar, May 2016.
- UC Irvine, Anteater Math Club, February 2016.
- Hunter College High School Science Research Seminar, December 2015.
- Yale University, "Math Mornings", February 2015.
- Museum of Mathematics, New York, "Family Fridays Program", April 2014.
- Yale Undergraduate Math Society, March 2014.
- Long Island Math Circle, November 2013.
- University of Connecticut Math Club, February 2013.
- Sam Houston State University Math Club, November 2008.
- Budapest Semesters in Mathematics, Budapest, Hungary, April 2008.

Teaching

- **University of California, Irvine**
  - Spring 2026: Math 232C: Algebraic Number Theory. (Graduate Course)
  - Winter 2026: Math 232B: Algebraic Number Theory. (Graduate Course)
  - Fall 2025: Math 232A: Algebraic Number Theory. (Graduate Course)
  - Spring 2025: Math 180B: Number Theory.
  - Winter 2025: Math 234B: Coding Theory. (Graduate Course)
  - Winter 2025: Math 180A: Number Theory.
  - Spring 2024: Math 180B: Number Theory.
  - Winter 2024: Math 180A: Number Theory.
  - Winter 2023: Math 230B: Algebra. (Graduate Course)
  - Fall 2022: Math 230A: Algebra. (Graduate Course)
  - Spring 2021: Math 206C: Algebra. (Graduate Course)
  - Winter 2021: Math 206B: Algebra. (Graduate Course)
  - Fall 2020: Math 206A: Algebra. (Graduate Course)
  - Summer 2020: Math 2B: Calculus. (Two sections)
  - Spring 2020: Math 2B: Calculus.
  - Winter 2020: Math 2B: Calculus.
  - Fall 2019: Math 2B: Calculus.
  - Winter 2019: Math 120A: Group Theory.

- – Fall 2018: Math 120A: Group Theory.
- – Spring 2018: Math 232C: Algebraic Number Theory. (Graduate Course)
- – Winter 2018: Math 175: Combinatorics.
- – Winter 2018: Math 232B: Algebraic Number Theory. (Graduate Course)
- – Fall 2017: Math 232A: Algebraic Number Theory. (Graduate Course)
- – Fall 2017: Math 3A: Introduction to Linear Algebra.
- – Spring 2017: Math 3A: Introduction to Linear Algebra. (Two sections)
- – Winter 2017: Math 175: Combinatorics.
- – Fall 2016: Math 233A: Algebraic Geometry. (Graduate Course)
- – Winter 2016: Math 120A: Group Theory.
- – Winter 2016: Math 230B: Algebra. (Graduate Course)
- – Fall 2015: Math 230A: Algebra. (Graduate Course)
- **Yale University**
  - – Spring 2015: Math 354: Number Theory.
  - – Spring 2015: Math 719: Asymptotic Problems in Number Theory. (Graduate Course)
  - – Fall 2014: Math 244: Discrete Mathematics.
  - – Spring 2014: Math 766: Elliptic Curves. (Graduate Course)
  - – Fall 2014: Math 244: Discrete Mathematics.
  - – Fall 2014: Math 120: Multivariable Calculus.
- **Harvard University**
  - – Spring 2013: Math 21B: Linear Algebra and Differential Equations.
  - – Fall 2012: Graduate Course Fellow, Math Ma: Introduction to Functions and Calculus I.
  - – Summer 2011: Mathematics Department Tutorial: "Coding Theory".
    - * Developed a six-week seminar for mathematics majors on the theory of error-correcting codes. Wrote notes together with undergraduate participants:
      http://www.math.uci.edu/~nckaplan/teaching_files/kaplancodingnotes.pdf
  - – Spring 2012, Fall 2010: Head Teaching Fellow, EMR 14: Fat Chance.
    - * Assisted in the development of a new probability and statistics course in Harvard's Program in General Education and served as teaching fellow for two weekly sections.
  - – January 2011: Graduate Student Minicourse: "A Mathematical Look at Some Popular Games".
    - * Selected by Harvard Graduate Student Council to develop a 10-hour course on mathematics and games.

Academic Advising and Mentoring: Graduate Students and Postdocs

- Postdoctoral Mentor at UC Irvine:
  - – Roberto Hernandez, 2025–Present.
  - – Harold Polo, 2023–2025.
  - – Gilyoung Cheong, 2021–2024.
  - – Claudio Gómez-Gonzáles, 2020–2021. (Co-Mentor with Jesse Wolfson)
  - – Vlad Matei, 2017–2020.
- PhD Thesis Advisor:
  - – Deepesh Singhal, UC Irvine, in progress.
  - – Fabian Ramirez, UC Irvine, in progress.
  - – Tianhao Wang, UC Irvine, in progress.
  - – Xu Zhuang, UC Irvine, in progress.
  - – Jessica Bennett, UC Irvine, in progress.
  - – Luke Fredericks, UC Irvine, graduated 2021.

Thesis: Average cyclicity for elliptic curves in torsion families.
- Kelly Isham, UC Irvine, graduated 2021.
  Thesis: Problems relating to arcs in projective space and subrings in $\mathbb{Z}^n$.
- Joseph Squillace, UC Irvine, graduated 2020. (Co-Advisor with Michael Cranston).
  Thesis: Couplings, Component Counting Processes, and Probabilistic Number Theory.
- Hayan Nam, UC Irvine, graduated 2019.
  Thesis: Counting Core Partitions and Numerical Semigroups Using Polytopes.
- Shaked Koplewitz, Yale University, graduated 2017. (Co-Advisor with Sam Payne).
  Thesis: Random Graphs, Sandpile Groups, and Surjectivity of Random Matrices.
- Ph.D. Thesis Committee Member:
  Michael Porter (2018), Jennifer Nguyen (2019), Ching-Heng Chiu (2019), Adrien Peltzer (2019), James Upton (2020), Scott Stetson (2020), Chao Chen (2021), Sarthak Chimni (University of Illinois, Chicago, 2021), Stanislav Atanasov (Columbia University, 2022), Ryan Burkhart (2022), Shichen Tang (2022), Hua Lin (2023), Liam Hardiman (2024), Fei Xiang (2025), Abdourrahmane Kabbaj (2025), Tingyu Tao (2025), Neeraj Kumar (University of Porto, 2025), Adam Marks (2025).
- Advancement to Candidacy Committee Member, UC Irvine:
  Hayan Nam, Joseph Squillace, Adrien Peltzer, Jennifer Nguyen, James Upton, Ching-Heng Chiu, Scott Stetson, Luke Fredericks, Alex Sutherland, Kelly Isham, Shichen Tang, Hannah Knight, Matthew Cheung, Fei Xiang, Hua Lin, Adam Marks, Deepesh Singhal, Tianhao Wang, Xiaonan Chen, Thurman Ye, Fabian Ramirez, Xu Zhuang, Nawal Baydoun, Siddhant Jajodia, Sireesh Vinnakota, Daniel Bustamente, Justin Wedal (Chemistry), Shreya Shukla (Physics).
- Faculty sponsor for UC Irvine AMS Graduate Student Chapter, 2017–Present.
- Co-facilitator of workshop session *Publishing in Mathematics, Engineering & Physical Sciences* at the Fall meeting of the UC President's Postdoctoral Fellowship Program, November 2024.
- Co-facilitator of workshop session *Tips for Tenure in Math, Engineering & Physical Sciences* at the Fall meeting of the UC President's Postdoctoral Fellowship Program, September 2023.
- Participant in panel discussion on the academic job search, Number Theory Series in LA Conference, Occidental College, October 2019.

Academic Advising and Mentoring: Undergraduates and HS Students

- *Cal-Bridge program UC Faculty Mentor*:
  Kristopher Ramirez 2024–2025, Elijah Valverde 2025–Present.
- *Summer Mathematics Research at UCI*: Summer 2024 and Summer 2025.
  - Designed a summer research experience for undergraduates and two PhD student mentors.
    Projects: *Numerical semigroups and integer partitions*, 2024 (six undergraduates).
    Variations on the No-Three-in-Line Problem, 2025 (five undergraduates).
- UCI Campuswide Honors Collegium thesis advisor: Cole McGeorge 2024–2025.
- *MIT Primes* High School Research Program: 2023–2024.
  - Co-Mentor (with Gilyoung Cheong) for three students.
    Project: *Cokernels of symmetric matrices over $\mathbb{Z}/p^k\mathbb{Z}$ with a fixed residue modulo p.*
- Panelist for BAMM! (Bolstering the Advancement of Masters in Mathematics) PhD program event, October 2021 and October 2022.
- Mentor for Math Alliance, 2020-Present.
- Faculty Co-Advisor for UCI Directed Reading Program, 2020–2021, 2022–Present.
- Panelist for Student Success Initiative event, "Demystifying the Office Hour", November 2018.
- Participant in UCI DREAM Center, Undergraduate Research Faculty Panel, February 2018.
- Developed research problems on numerical semigroups for 2019 San Diego State University REU.
- *PROMYS (Program in Mathematics for Young Scientists* Research Program, Summer 2018, 2022.

- Developed research problems in discrete math for high school students.
- Supervisor for Student Reading Courses and Independent Projects:
  - Luoning Zhang and Jeremy Jiang, Spring 2025.
  - Tycho Elling and Cole McGeorge, Fall 2024.
  - Kaylee Kim and Cole McGeorge, Spring 2024.
  - Sogol Cyrusian, Winter 2024 – Spring 2025.
  - Merrick Hua, Families of Numerical Semigroups, Summer 2021.
  - James Barty, Elliptic Curves/Coding Theory, UC Irvine, Fall 2019 and Winter 2020.
  - Michael Yates, Sandpile Groups, UC Irvine, Fall 2019.
  - Tingyu Tao, Elliptic Curves, UC Irvine, Spring 2018.
  - Tim Nguyen, Enumerative Combinatorics, UC Irvine, Winter 2018.
  - Jon Pham, Analytic Number Theory, UC Irvine, Spring 2017.
    ⋆ Selected by Jon at School of Physical Sciences Honors Awards ceremony as the faculty member who made the greatest impact on his education at UCI.
  - HeeJong Lee, Algebraic Number Theory, UC Irvine, Spring and Fall 2016.
  - Alec Fox, Number Theory and Elliptic Curves, UC Irvine, Winter and Spring 2016.
  - Marko Micic, Senior Project: Pseudorandom Number Generators, Yale University, 2015.
  - Benjamin Peterson, Senior Thesis on Elliptic Curves, Yale University, 2015.
  - Carsten Peterson, Generalized Numerical Semigroups, Yale University, 2015.
- *SUMRY (Summer Undergraduate Mathematics Research at Yale)*, Summer 2014 and 2015.
  - Helped develop a new summer research program for math majors at Yale. Supervised two undergraduates on a research project in combinatorics. The paper resulting from their work was published in the proceedings of the 2014 and 2015 CANT conference.
  - Helped plan the second year of the program and supervised three student research groups of three students each. Each of these projects has resulted in a paper in a professional mathematics journal (*Acta Arithmetica*, *Journal of Geometry*, and *Discrete Mathematics*).
- Science Research Mentorship Program, Hunter College High School, Summer 2014.
  - Supervised a summer research project in algebra by a high school student. Project won a national award from the AMS at the Intel ISEF competition and has resulted in a joint paper in Journal of Commutative Algebra.
- Graduate Assistant, University of Minnesota Duluth REU, Summer 2008, 2009.
- Graduate Assistant, Trinity University REU, Summer 2007.

Organizational Activities

- Co-organizer for Southern California Discrete Mathematics Symposium 2025 (SoCalDM2025), UCI, April 2025.
- Organizer for 2021 Joint Mathematics Meeting MAA Invited Paper Session "Coding Theory and Geometry".
- Co-organizer for November 2019 AMS Fall Western Sectional Meeting Special Session "Arithmetic Geometry in Finite Characteristic".
- Co-organizer for Conference "Open Questions in Cryptography and Number Theory", UCI, September 2018.
- Co-organizer for AMS/MAA 2017 Joint Mathematics Meeting Special Session "Mathematics of Cryptography".
- Co-organizer for Southern California Number Theory Day at UCI, 2016, 2017, 2019, 2022, 2023, 2024, 2025.
- Local organizer, Conference on Mathematics of Cryptography, UC Irvine, August 2015.
- Co-organizer for Biannual Algebraic and Tropical Meetings of Brown and Yale (2014–2015).

- Co-organizer for the UCI Number Theory Seminar (2015–present).
- Co-organizer for the Yale Number Theory Seminar (2013–2015).
- Co-organizer for the Yale Algebraic and Tropical Geometry Seminar (2014–2015).

Service at UCI
- UCI Physical Sciences Awards Committee, 2026–Present.
- UCI Award & Communication Committee, 2024–Present (Chair).
- UCI Outreach Committee, 2024–2025.
- Alternate Representative to UCI Universitywide Assembly, 2022–2024.
- UCI Undergraduate Advising Committee, 2023–2024.
- UCI Thorp Chair Hiring Committee, 2022–2024, 2025–Present.
- UCI President's Postdoctoral Fellowship Committee, 2022–2023.
- UCI Awards Committee, 2020–2021.
- UCI Hiring Committee, 2019–2020, 2023–2024.
- UCI Visiting Assistant Professor Committee, 2019–2020.
- UCI Colloquium Committee, 2018–2019.
- UCI Undergraduate Studies Committee, 2017–2018, 2024–Present.
- UCI Distinguished Visitor Committee, 2017–2018.
- UCI Graduate Studies Committee, 2016–2017, 2019–2020, 2020–2021.
- UCI Algebra Comprehensive Exam Committee, Spring: 2019, 2020; Fall 2020.
- UCI Algebra Qualifying Exam Committee, (10 exams total from 2015–2024).
- UCI Graduate Admissions Committee, 2015-2016, 2018-2019.

Other Service
- Reviewer for UK Research and Innovation proposal, 2025.
- Ad hoc reviewer for National Science Foundation proposal, 2024.
- Panel member for National Science Foundation review panel, 2021-2022, Fall 2024.
- Proposal reviewer for the National Research, Development and Innovation Office, Hungary, 2024.
- AMS-MAA-SIAM Morgan Prize Selection Committee, 2020–2023. Chair (2022–2023).
- Reviewer for Research Grants Council of Hong Kong proposal, 2021, 2022.
- Reviewer for NSERC Discovery Grant, 2018.
- Served as referee for 53 articles in 32 journals and 4 conference proceedings.
- Reviewed 50 articles and 2 books for *Math Zentralblatt*, 2010–Present.
- Reviewed 17 articles for *Math Reviews*, 2017–Present.
- Reviewer a general audience mathematics book for *Princeton University Press*.
- Reviewer for MAA Reviews: *Algebraic Geometry Codes: Advanced Chapters*.
- Barge Prize Exam Committee, Yale University, Spring 2014.

Professional Development at UCI
- UC Irvine Active Learning Institute, Fall 2022.
  Received *Certificate in Active Learning*.
- UC Irvine Inclusive Excellence Certificate Program 2020–2021.
  Completed two-quarter weekly certificate program focused on diversity, equity, and inclusion.

Other Experience
- Intern, Microsoft Research New England (Supervisor: Henry Cohn), Fall 2011.