Daniel M. Kane

CV

(Last updated 8/29/2018)

Work Address: Department of Computer Science and Engineering, 9500 Gilman Drive #0404, La Jolla, CA 92093-0404

Email: dakane at ucsd dot edu

Phone: (858) 246-0102

Website: http://cseweb.ucsd.edu/~dakane/

Citizenship: USA

Education:

- Harvard University: September 2007-May 2011
  - M.A. in Mathematics, June 2008
  - Ph.D. in Mathematics, May 2011
  - Research Advisors: Barry Mazur, Benedict Gross, Henry Cohn
- Massachusetts Institute of Technology: September 2003- May 2007
  - B.S. in Mathematics with Computer Science, June 2007
  - B.S. in Physics, June 2007
  - Graduated Phi Beta Kappa with a Perfect GPA
  - Research Advisors: Erik Demaine, Joe Gallian, Cesar Silva
- University of Wisconsin-Madison: September 1999 – May 2003, enrolled as a special student while in high school
  - 20 Courses in Mathematics, Physics, Computer Science and Economics
  - GPA 3.99/4.00
  - Research Advisor: Ken Ono

Employment:

Assistant Professor Mathematics and Computer Science and Engineering, University of California, San Diego, 2014-present.

Past Employment:

Postdoctoral Fellow, Stanford University Department of Mathematics (2011-2014) [on NSF fellowship]

Other Employment/Summer Internships:

- Intern at Center for Communications Research (summers of 2007, 2008, 2009, 2011, 2012, 2013,2014). Continuing consulting.
- Consultant for Beyondcore (2011-2014).
- Intern at Microsoft Research New England working with Henry Cohn (summer 2010).
- Consultant for Professor Peter Coles of the Harvard Business School (2008-2009).
- MIT Undergraduate Research Opportunities Program (UROP) working under Erik Demaine on problems in theoretical computer science (summer 2006).
- Participant in the Duluth Research Experiences for Undergraduates program (summer 2005, as a visitor in 2003 and 2006).
- Participant in the SMALL Research Experiences for Undergraduates program at Williams College working under Cesar Silva (summer 2004).

Research Interests:

My research interests are broad and cover a number of areas in mathematics and computer science, but most of what I do is in number theory, combinatorics, or complexity theory. For the last couple years, the bulk of my work has been on computational statistics / machine learning.

Papers:

My Ph.D. thesis: On Elliptic Curves, the ABC Conjecture, and Polynomial Threshold Functions.

Mathematics:

- Daniel M. Kane, Zev Klagsbrun, On the Joint Distribution Of $Sel_{\varphi}(E/Q)$ and $Sel_{\varphi\hat{}}(E/Q)$ in Quadratic Twist Families, in preparation.
- Daniel M. Kane, Carlo Sanna, Jeffrey Shallit Waring's Theorem for Binary Powers, submitted to *Combinatorica*.
- Ben Green, Daniel M. Kane, An Example Concerning Set Addition in F_2^n, submitted to *Trudy Matematicheskogo Instituta im. V.A. Steklova*.
- Daniel M. Kane Asymptotic Results for the Queen Packing Problem, submitted to *Journal of Combinatorics*.
- Daniel M. Kane, Robert C. Rhoades A Proof of Andrews' Conjecture on Partitions with no Short Sequences, submitted for *Forum of Mathematics Sigma*.
- Daniel M. Kane, Joseph Palmer, Alvaro Pelayo Minimal Models of Compact Symplectic Semiotic Manifolds, *Journal of Geometry and Physics*, Vol 125 (2018) pp. 48-74.
- Daniel M. Kane, Joseph Palmer, Alvaro Pelayo Classifying Toric and Semitoric Fans by Lifting Equations from $SL_2(Z)$, *SIGMA* Vol 14 (2018).
- Daniel M. Kane, Terence Tao A Bound on Partitioning Clusters, *Electronic Journal of Combinatorics* Vol 24 no 2 (2017) #P2.31.
- Daniel M. Kane On the Crossing Number of Complete Graphs with an Uncrossed Hamiltonian Cycle, manuscript.
- Daniel M. Kane, Jack A. Thorne, On the φ-Selmer Groups of Elliptic Curves $y^2 = x^3 - Dx$, *Mathematical Proceedings of the Cambridge Philosophical Society*, Vol 163 no 1 (2017) pp. 1–23.
- Daniel M. Kane On the Number of ABC Solutions with Restricted Radical Sizes, *Journal of Number Theory*, (2015), pp. 32-43.
- Daniel M. Kane Small Designs for Path Connected Spaces and Path Connected Homogeneous Spaces, *Transactions of the AMS*, Vol. 367 (2015), pp. 6387-6414.

- Daniel M. Kane Canonical Projective Embeddings of the Deligne-Lusztig Curves Associated to ${}^2A_2$, ${}^2B_2$ and ${}^2G_2$, *International Mathematics Research Notices*, (2015) pp. 1158-1189.
- Manjul Bhargava, Daniel M. Kane, Hendrik W. Lenstra Jr., Bjorn Poonen, Eric Rains Modeling the Distribution of Ranks, Selmer Groups, and Shafarevich-Tate Groups of Elliptic Curves, *Cambridge Journal of Mathematics*, Vol. 3 (2015), pp. 275-321.
- Bobbie Chern, Persi Diaconis, Daniel M. Kane, Robert C. Rhoades Central Limit Theorems for Some Set Partition Statistics, *Advances in Applied Mathematics*, Vol. 70 (2015), pp. 92–105.
- Andrew Granville, Daniel M Kane, Dimitris Koukoulopoulos, Robert J Lemke Oliver Best Possible Densities of Dickson m-Tuples, as a Consequence of Zhang–Maynard–Tao in *Analytic Number Theory* Springer, 2015.
- Bobbie Chern, Persi Diaconis, Daniel M. Kane, Robert C. Rhoades Closed Expressions for Averages of Set Partition Statistics, *Research in the Mathematical Sciences*, Vol. 1 (2014) no. 2.
- Daniel M. Kane, Scott Duke Kominers Asymptotic Improvements of Lower Bounds for the Least Common Multiples of Arithmetic Progressions, *Canadian Mathematical Bulletin*, Vol. 57 (2014), pp. 551-561.
- Noam D. Elkies, Daniel M. Kane, Scott Duke Kominers, Minimal S-Criteria May Vary in Size, *Journal de Theorie des Nombres de Bordeaux*, Vol. 23 no. 3 (2013) pp. 557-563.
- Daniel M. Kane On the Ranks of the 2-Selmer Groups of Twists of a Given Elliptic Curve, *Algebra & Number Theory*, 5 (2013), pp. 1253-1297.
- Daniel M. Kane An Asymptotic for the Number of Solutions to Linear Equations in Prime Numbers from Specified Chebotarev Classes, *International Journal of Number Theory*, Vol. 9 no. 4 (2013) pp. 1073-1111.
- Chris Dodd, Phakawa Jeasakul, Anne Jirapattanakul, Daniel M. Kane, Becky Robinson, Noah Stein, Cesar E. Silva Ergodic Properties of a Class of Discrete Abelian Group Extensions of Rank-One Transformations, *Colloquium Mathematicum*, 119 (2010), pp. 1-22.
- Daniel M. Kane On Solving Games Constructed Using Both Shortened and Continued Conjunctive Sums, *Integers: Electronic Journal of Combinatorial Number Theory*, 10 (2010), pp. 849-878.
- Daniel M. Kane A Partition of the Positive Reals into Algebraically Closed Subsets, unpublished.
- Bakir Farhi, Daniel Kane New Results on the Least Common Multiple of Consecutive Integers, *Proceedings of the AMS*, 137 (2009), no. 6, pp. 1933-1939.
- Daniel Kane, Steven Sivek On the S_n-Modules Generated by Partitions of a Given Shape, *The Electronic Journal of Combinatorics*, 15 (2008), 12 pages.
- Daniel M. Kane On Lower Bounds on the Size of Sums-of-Squares Formulas *Journal of Number Theory*, 128 (2008) pp. 639-644.
- Daniel M. Kane Improved Bounds on the Number of Ways of Expressing *t* as a Binomial Coefficient, *Integers: Electronic Journal of Combinatorial Number Theory*, Vol. 7 (2007), #A53 pp. 1-7.
- Dan Gulotta, Daniel M. Kane, Andrew Spann Electoral Redistricting with Moment of Inertia and Diminishing Halves Models(3.81 MB) *UMAP Journal*, Vol. 28 (2007), pp. 281-299

- Daniel M. Kane Weak Mixing of a Transformation Similar to Pascal, *Colloquium Mathematicum*, Vol. 108 no. 1(2007), pp. 135-140.
- Daniel M. Kane Asymptotics of McKay Numbers for Sn, *Journal of Number Theory*, Vol. 124 (2007) pp. 200-228.
- Dan Gulotta, Daniel M. Kane, Andrew Spann Application of Min-Cost Flow to Airline Accessibility Services *UMAP Journal*, Vol. 27 (2006), pp. 367-385.
- Daniel M. Kane Generalized Base Representations *Journal of Number Theory*, Vol. 120 (2006) pp. 92-100.
- Daniel M. Kane, Jonathan M. Kane Dropping Lowest Grades *Mathematics Magazine*, Vol. 79 (June 2006) pp. 181-189.
- Daniel M. Kane An Elementary Derivation of the Asymptotics of Partition Functions *The Ramanujan Journal*, Vol. 11 no. 1(2006) pp. 49-66.
- Dan Gulotta, Daniel M. Kane, Andrew Spann Lane Changes and Close Following: Troublesome Tollbooth Traffic(6 MB) *UMAP Journal*, Vol. 26 no. 3 (2005) pp. 251-264.
- Daniel M. Kane On the Number of Ways of Writing t as a Product of Factorials *Integers: Electronic Journal of Combinatorial Number Theory*, Vol. 5 (2005), #A02, pp. 1-10.
- Daniel M. Kane Resolution of a Conjecture Involving Cranks of Partitions of Andrews and Lewis *Proceedings of the American Mathematical Society*, Vol. 132 No. 8(2004), pp. 2247-2256.
- Daniel M. Kane New Bounds on the Number of Representations of t as a Binomial Coefficient *Integers: Electronic Journal of Combinatorial Number Theory*, Vol. 4 (2004), #A07, pp. 1-10.

Computer Science:

- Ilias Diakonikolas, Daniel M Kane, Alistair Stewart Sharp Bounds for Generalized Uniformity Testing, in preparation.
- Daniel M Kane, Ryan Williams The Orthogonal Vectors Conjecture for Branching Programs and Formulas, in preparation.
- Daniel M Kane, Roi Livni, Shay Moran, Amir Yehudayoff On Communication Complexity of Classification Problems, in preparation.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Efficient Robust Proper Learning of Log-concave Distributions, in preparation.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Robust Learning of Fixed-Structure Bayesian Networks, in preparation.
- Ilias Diakonikolas, Daniel M. Kane, John Peebles Testing Identity of Multidimensional Histograms, in preparation.
- Ilias Diakonikolas, Gautam Kamath, Daniel M. Kane, Jerry Li, Jacob Steinhardt, Alistair Stewart Sever: A Robust Meta-Algorithm for Stochastic Optimization, in preparation
- Daniel M Kane, Shachar Lovett, Shay Moran Generalized Comparison Trees for Point-Location Problems, *International Colloquium on Automata, Languages and Programming* (ICALP) 2018, to appear.
- Ilias Diakonikolas, Daniel M Kane, Alistair Stewart Learning Geometric Concepts with Nasty Noise, *Symposium on Theory Of Computation* (STOC) 2018, to appear.

- Clement Canonne, Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Testing Conditional Independence of Discrete Distributions, *Symposium on Theory Of Computation* (STOC) 2018, to appear.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart List-Decodable Robust Mean Estimation and Learning Mixtures of Spherical Gaussians, *Symposium on Theory Of Computation* (STOC) 2018, to appear.
- Daniel M Kane, Shachar Lovett, Shay Moran Near-Optimal Linear Decision Trees for k-SUM and Related Problems, *Symposium on Theory Of Computation* (STOC) 2018, to appear, invited to STOC special issue.
- Daniel M Kane, Sankeerth Rao A PRG for Boolean PTF of Degree 2 with Seed Length Subpolynomial in ε and Logarithmic in n, *Conference on Computational Complexity* (CCC) 2018, to appear.
- Ilias Diakonikolas, Gautam Kamath, Daniel M. Kane, Jerry Li, Ankur Moitra, Alistair Stewart Robustly Learning a Gaussian: Getting Optimal Error Efficiently, *Symposium On Discrete Algorithms* (SODA) 2018.
- Daniel Kane, Sushrut Karmalkar, Eric Price Robust Polynomial Regression up to the Information Theoretic Limit, *Foundations of Computer Science* (FOCS) 2017.
- Daniel M. Kane, Shachar Lovett, Shay Moran, Jiapeng Zhang, Active Classification with Comparison Queries *Foundations Of Computer Science* (FOCS) 2017.
- Daniel M Kane, Shachar Lovett, Sankeerth Rao, The Independence Number of the Birkhoff Polytope Graph and Applications to Maximally Recoverable Codes, *Foundations Of Computer Science* (FOCS) 2017.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Statistical Query Lower Bounds for Robust Estimation of High Dimensional Gaussians and Gaussian Mixtures, *Foundations Of Computer Science* (FOCS) 2017.
- Ilias Diakonikolas, Daniel M. Kane, Vladimir Nikishkin Near-Optimal Closeness Testing of Discrete Histogram Distributions, *International Colloquium on Automata, Languages and Programming* (ICALP) 2017.
- Ilias Diakonikolas, Gautam Kamath, Daniel M. Kane, Jerry Li, Ankur Moitra, Alistair Stewart Being Robust in High Dimensions Can Be Practical, *International Conference on Machine Learning* (ICML) 2017.
- Clement Canonne, Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Testing Bayesian Networks, *Conference on Learning Theory* (COLT) 2017.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart Learning Multivariate Log-concave Distributions, *Conference On Learning Theory* (COLT) 2017.
- Valentine Kabanets, Daniel M. Kane, Zhenjian Lu A Polynomial Restriction Lemma with Applications, *Symposium on Theory Of Computation* (STOC) 2017.
- Chung-Kuan Cheng, Daniel M. Kane, Ilgweon Kang, Fang Qiao, 3D Floorplan Representations: Corner Links and Partial Ordering, *IEEE International 3D Systems Integration Conference* (3DIC) 2016.
- Xue Chen, Daniel M. Kane, Eric Price, Zhao Song, Fourier-sparse interpolation without a frequency gap, *Foundations Of Computer Science*, (FOCS) 2016.
- Ilias Diakonikolas, Gautam Kamath, Daniel M. Kane, Jerry Li, Ankur Moitra, Alistair Stewart, Robust Estimators in High Dimensions, without the Computational Intractability, *Foundations Of Computer Science,* (FOCS) 2016.

- Ilias Diakonikolas, Daniel M. Kane, A New Approach for Testing Properties of Discrete Distributions, *Foundations Of Computer Science*, (FOCS) 2016.
- Mihir Bellare, Daniel M. Kane, Phillip Rogaway Big-Key Symmetric Encryption: Resisting Key Exfiltration, *International Cryptography Conference* (CRYPTO) 2016.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart, Nearly Optimal Learning and Sparse Covers for Sums of Independent Integer Random Variables, *Conference On Learning Theory*, (COLT) 2016.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart, Properly Learning Poisson Binomial Distributions in Almost Polynomial Time, *Conference On Learning Theory*, (COLT) 2016.
- Daniel M. Kane, Ryan Williams, Super-Linear Gate and Super-Quadratic Wire Lower Bounds for Depth-Two and Depth-Three Threshold Circuits, *Symposium on the Theory of Computation (STOC)* 2016.
- Ilias Diakonikolas, Daniel M. Kane, Alistair Stewart The Fourier Transform of Poisson Multinomial Distributions and its Algorithmic Applications, *Symposium on the Theory of Computation* (STOC) 2016.
- Mihir Bellare, Joseph Jaeger, Daniel Kane, Mass-surveillance without the State: Strongly Undetectable Algorithm-Substitution Attacks on Symmetric Encryption, *Conference on Computer and Communications Security* (CCS) 2016.
- Ilias Diakonikolas, Daniel M. Kane, Vladimir Nikishkin, Optimal Algorithms and Lower Bounds for Testing Closeness of Structured Distributions, *Foundations of Computer Science*, (FOCS) 2015.
- Parikshit Gopalan, Daniel M. Kane, Raghu Meka, Pseudorandomness via the Discrete Fourier Transform, *Foundations of Computer Science* (FOCS) 2015.
- Daniel M. Kane A Polylogarthmic PRG for Degree 2 Threshold Functions in the Gaussian Setting, *Conference on Computational Complexity* (CCC) 2015.
- Jeffery S. Cohen, Daniel M. Kane Bounds on the Independence Required for Cuckoo Hashing, submitted to *ACM Transactions on Algorithms*.
- Ilias Diakonikolas, Daniel M. Kane, Vladimir Nikishkin, Testing Identity of Structured Distributions, *Symposium On Discrete Algorithms* (SODA) 2015.
- Daniel M. Kane, Osamu Watanabe A Short Implicant of CNFs with a Relatively Many Satisfying Assignments, *International Symposium on Algorithms And Computation* (ISAAC) 2014; journal version *Algorithmica*, (2016), DOI: 10.1007/s00453-016-0125-z.
- Daniel M. Kane The Average Sensitivity of an Intersection of Half Spaces, *Symposium on the Theory Of Computing* 2014, journal version (open access) in *Research In the Mathematical Sciences* Vol. 1 no 1 (2014).
- Daniel M. Kane A Pseudorandom Generator for Polynomial Threshold Functions of Gaussians with Subpolynomial Seed Length, *Conference on Computational Complexity* 2014.
- Daniel M. Kane, Adam Klivans, Raghu Meka Learning Half Spaces Under Log-Concave Densities: Polynomial Approximation and Moment Matching, *Conference on Learning Theory* (COLT) 2013.
- Daniel M. Kane The Correct Exponent for the Gotsman-Linial Conjecture, *Conference on Computational Complexity* (CCC) 2013 (won best paper award).
- Daniel M. Kane, Raghu Meka A PRG for Lipschitz Functions of Polynomials with Applications to Sparsest Cut, *Symposium on the Theory of Computation* (STOC) 2013.

- Daniel M. Kane A Low-Depth Monotone Function Given by a Low-Depth Decision Tree that is not an Approximate Junta, *Theory of Computing* Vol. 9 (2013) pp. 587-592.
- Daniel M. Kane A Structure Theorem for Poorly Anticoncentrated Gaussian Chaoses and Applications to the Study of Polynomial Threshold Functions, *Foundations of Computer Science* (FOCS) 2012, pp. 91-100; journal version *Annals of Probability*, Vol. 45 no. 3 (2017) pp. 1612-1679.
- Daniel M. Kane, Kurt Mehlhorn, Thomas Sauerwald, He Sun Counting Arbitrary Subgraphs in Data Streams, *International Colloquium on Automata, Languages and Programming* (ICALP) 2012, pp. 598-609.
- Eric Blais, Daniel Kane Tight Bounds for Testing k-Linearity, *International Workshop on Randomization and Computation* (RANDOM) 2012.
- Daniel M. Kane, Jelani Nelson, Sparser Johnson-Lindenstrauss Transforms, *Symposium on Discrete Algorithms* (SODA) 2012, *Journal of the ACM*, Vol. 61 no. 1, Article 4, 2014.
- Daniel M. Kane, A Small PRG for Polynomial Threshold Functions of Gaussians, *Foundations of Computer Science* (FOCS) 2011.
- Daniel M. Kane, Raghu Meka, Jelani Nelson, Almost Optimal Explicit Johnson-Lindenstrauss Transforms, *International Workshop on Randomization and Computation* (RANDOM), 2011.
- Daniel Kane, Jelani Nelson, A Derandomized Sparse Johnson-Lindenstrauss Transform, superseded by Sparser Johnson-Lindenstrauss Transforms (above).
- Daniel M. Kane k-Independent Gaussians Fool Polynomial Threshold Functions, *Conference on Computational Complexity* (CCC), 2011.
- Daniel M. Kane, Jelani Nelson, Ely Porat, David P. Woodruff, Fast Moment Estimation in Data Streams in Optimal Space, *Symposium on the Theory of Computing* (STOC) 2011.
- Daniel M. Kane, Samuel A. Kutin, Quantum Interpolation of Polynomials, presented at *Combinatorics, Groups, Algorithms, and Complexity (conference in honor of Laci Babai's 60th birthday* (CGAC) 2010, journal version in *Quantum Information and Computation* Vol. 11 no. 1&2 (2011).
- Daniel M. Kane Unary Subset-Sum is in Logspace, unpublished.
- Ilias Diakonikolas, Daniel M. Kane, Jelani Nelson, Bounded Independence Fools Degree-2 Threshold Functions, *Foundations of Computer Science* (FOCS) 2010.
- Daniel M. Kane The Gaussian Surface Area and Noise Sensitivity of Degree-d Polynomial Threshold Functions, in *Conference on Computational Complexity* (CCC) 2010, pp. 205-210 (Won CCC 2010 best student paper).
- Daniel M. Kane, Jelani Nelson, David P. Woodruff An Optimal Algorithm for the Distinct Elements Problem, *Symposium on Principles of Database Systems* (PODS) 2010 (Won PODS 2010 best paper, and 2010 IBM research Pat Goldberg Memorial Best Paper Award in Computer Science, Electrical Engineering and Math). *Invited to Journal of the ACM*.
- Daniel M. Kane, Jelani Nelson, David P. Woodruff On the Exact Space Complexity of Sketching and Streaming Small Norms, *Proceedings of the 21st Annual ACM-SIAM Symposium on Discrete Algorithms* (SODA) 2010.
- Erik D. Demaine, Dion Harmon, John Iacono, Daniel M. Kane, Mihai Pătraşcu, The Geometry of Binary Search Trees, in *Symposium on Discrete Algorithms* (SODA) 2009.

- Daniel M. Kane, Gregory N. Price, Erik D. Demaine, A Pseudopolynomial Algorithm for Alexandrov's Theorem, *Algorithms and Data Structures Symposium* (WADS) 2009. Also in *Lecture Notes in Computer Science*, 5664 (2009) pp. 435–446.
- Tim G. Abbott, Daniel M. Kane, Paul Valiant On the Complexity of Two-Player Win-Lose Games *Foundations Of Computer Science* (FOCS) 2005 (Won Machtey award for best student paper).
- Timothy G. Abbott, Michael A. Burr, Timothy M. Chan, Erik D. Demaine, Martin L. Demaine, John Hugg, Daniel Kane, Stefan Langerman, Jelani Nelson, Eynat Rafalin, Kathryn Seyboth, Vincent Yeung, Dynamic Ham-Sandwich Cuts in the Plane, *Computational Geometry: Theory and Applications*, Vol. 42, no. 5, July 2009, pages 419–428. *Special issue of selected papers from the 17th Canadian Conference on Computational Geometry*, 2005.
- Tim Abbott, Erik D. Demaine, Martin L. Demaine, Daniel M. Kane, Setfan Langerman, Jelani Nelson, Vincent Yeung Dynamic Ham-Sandwich Cuts of Polygons in the Plane *Canadian Conference on Computational Geometry*, (2005) pp. 61-64.

Coauthors: Tim Abbott, Mihir Bellare, Manjul Bhargava, Eric Blais, Michael A. Burr, Clement Canonne, Timothy M. Chan, Xue Chen, Chung-Kuan Cheng, Bobbie Chern, Jeffery Cohen, Erik Demaine, Martin Demaine, Ilias Diakonikolas, Chris Dodd, Noam Elkies, Bakir Farhi, Andrew Granville, Parikshit Gopalan, Ben Green, Dan Gulotta, John Hugg, John Iacono, Joseph Jaeger, Phakawa Jeasakul, Anne Jirapattanakul, Gautam Kamath, Valentine Kabanets, Jonathan Kane, Ilgweon Kang, Zev Klagsbrun, Adam Klivans, Scott Kominers, Dimitris Koukoulopoulos, Samuel A. Kutin, Setfan Langerman, Robert Lemke Oliver, Hendrik W. Lenstra Jr., Jerry Li, Roi Livni, Shachar Lovett, Zhenjian Lu, Shay Moran, Kurt Mehlhorn, Raghu Meka, Ankur Moitra, Jelani Nelson, Vladimir Nikishkin, Joseph Palmer, Mihai Pătraşcu, John Peebles, Alvaro Pelayo, Bjorn Poonen, Ely Porat, Eric Price, Gregory N. Price, Fang Qiao, Eynat Rafalin, Eric Rains, Sankeerth Rao, Robert Rhoades, Becky Robinson, Phillip Rogaway, Carlo Sanna, Thomas Sauerwald, Kathryn Seyboth, Jeffrey Shallit, Cesar E. Silva, Zhao Song, Andrew Spann, Jacob Steinhardt, Alistair Stewart, Terence Tao, Noah Stein, Jack A. Thorne, He Sun, Paul Valiant, Osamu Watanabe, Ryan Williams, David P. Woodruff, Vincent Yeung, Amir Yehudayoff

---

Talks:

- Invited to give a talk at Open questions in number theory and cryptography conference in celebration of Alice Silverberg's 60th birthday.
- Invited to give a talk at HALG 2018
- Daniel M Kane Recent Advances in High Dimensional Robust Statistics Institute for Advanced Study, December 2017.

- Daniel M. Kane Recent Results on The Queen Packing Problem UC Berkeley Combinatorics seminar, February 2017.
- Daniel M. Kane A New Approach to Distribution Testing, UCSD CS Theory Seminar, October 2015; Harvard CS Theory Seminar, August 2016; Banff Center Complexity Theory Workshop, September 2016.
- Daniel M. Kane Average Phi-Selmer of Elliptic Curves, Arithmetic Statistics and Cohen Lenstra Heuristics Workshop at Warwick, June 2016.
- Daniel M. Kane A Polylogarithmic PRG for Degree-2 PTFs in the Gaussian Setting, Conference on Computational Complexity, June 2015.
- Daniel M. Kane Connection Regions on a Randomly Colored Board given at the awards ceremony for the UCSD honors math contest, May 2015.
- Daniel M. Kane On a Problem Related to the ABC Conjecture given at Southern California Number Theory Day, October 2014.
- Daniel M. Kane The Average Sensitivity of an Intersection of Halfspaces, Symposium on the Theory of Computation, June 2014.
- Daniel M. Kane On a Problem Related to the ABC Conjecture given at CMU March 2014.
- Daniel M. Kane An Optimal Algorithm for the Distinct Elements Problem (joint work with Jelani Nelson and David Woodruff) given at UCSD February 2014; UW-Madison March 2014.
- Daniel M. Kane A Pseudorandom Generator for Polynomial Threshold Functions with Subpolynomial Seed Length MIT Algorithms and Complexity Seminar, November 2013; UCSD CS Theory Seminar, October 2014; short version given at Conference on Computational Complexity, June 2014.
- Daniel M. Kane Dropping Lowest Grades Stanford math undergraduate colloquium, October 2013; UCSD Math 196 (undergrad colloquium) talk, October 2014.
- Daniel M. Kane, Raghu Meka, A PRG for Lipchitz Functions of Polynomials with Applications to Sparest Cut, Symposium on the Theory Of Computation, June 2013.
- Daniel M. Kane The Correct Exponent for the Gotsman-Linial Conjecture, Conference on Computational Complexity, June 2013; Longer, informal talk at the Microsoft Research/MIT Theory Reading Group, May 2013; Stanford theory lunch, June 2014.
- Daniel M. Kane Bounds on the Independence Required for Cuckoo Hashing (joint work with Jeffery Cohen) CMU Seminar on Algorithms, Combinatorics, and Optimization, April 2013.
- Daniel M. Kane The Asymptotics of Partitions without k-Sequences (joint work with Robert Rhoades) American Mathematical Society Special Session on The Influence of Ramanujan on His 125th Birthday, Joint Mathematics Meetings, San Diego, CA, January 2013. Longer version, given at Bay Area Discrete Math Day (BAD Math Day), April 2013.
- Daniel M. Kane Diffuse Decompositions of Polynomials, Symposium on the Analysis of Boolean Functions: New Directions and Applications, St. John Virgin Islands, February 2012; MIT Probability Seminar, Cambridge MA, March 2012; San Jose State University Mathematics Colloquium, San Jose CA, November 2012; short version at Symposium on the Foundations of Computer Science (FOCS), New Brunswick NJ, October 2012; Stanford University Probability Seminar, Stanford, CA, December 2012; IAS Computer Science/Discrete Math Seminar April, 2013; Columbia CS Theory Seminar, April 2013;

University of Wisconsin-Madison Number Theory-Representation Theory Seminar November 2013; Courant Institute December 2013; UCSD January 2014; CMU March 2014; University of Edinburgh, November 2014; UCLA Analysis and PDE Seminar January 2017.

- Daniel M. Kane The Number of Ways of Expressing a Number as a Binomial Coefficient, Stanford University Mathematical Organization talk, Stanford CA, October 2011.
- Daniel M. Kane A Small PRG for Polynomial Threshold Functions of Gaussians, Symposium on the Foundations Of Computer Science (FOCS), Palm Springs CA, October 2011.
- Daniel M. Kane Noise Sensitivity of Polynomial Threshold Functions, MSRI Workshop on Quantitative Geometry, Berkeley CA, August 2011.
- Daniel M. Kane k-Independence Fools Polynomial Threshold Functions of Gaussians, Conference on Computational Complexity (CCC), San Jose CA, June 2011.
- Daniel M. Kane Ranks of 2-Selmer of Twists of an Elliptic Curve, South Eastern Regional Meeting on Numbers (SERMON), Savannah GA, April 2011; Workshop on Arithmetic of Abelian Varieties in Families at Centre Interfacultaire Bernoulli (CIB), Lausanne Switzerland, November 2012; UCLA Number Theory Seminar, December 2013; Stanford Number Theory Seminar, January 2014; Longer version given at the Quebec-Vermont Number Theory Seminar, Montreal, January 2014.
- Daniel M. Kane The FT-Mollification Method, Workshop on Analysis and Geometry of Polynomial Threshold Functions, Princeton NJ, October 2010.
- Daniel M. Kane The ABC Conjecture Microsoft Research, Cambridge, MA, July 2010.
- Daniel Kane The Gaussian Surface Area and Noise Sensitivity of Degree-d Polynomial Threshold Functions, Conference on Computational Complexity (CCC), Cambridge MA, June 2010; China Theory Week, Beijing China, September 2010.
- Dan Gulotta, Daniel Kane, and Andrew Spann, Electoral Redistricting with Moment of Inertia and Diminishing Halves Models SIAM meeting, San Diego CA, July 2008.
- Daniel M. Kane The Number of Ways of Expressing *t* as a Binomial Coefficient Joint Mathematics Meetings, January 2007.
- Daniel M. Kane On Solving Games Constructed Using Both Shortened and Continued Conjunctive Sums Joint Mathematics Meetings, New Orleans LA, January 2006.
- Daniel M. Kane Ergodic Properties of Group Extensions of Rank 1 Transformations Part II Mathfest, Providence RI, August 2004.

Books contributed to:

- *Writing Proofs in Analysis*, Jonathan Kane, Springer, 2016.
- *USA & International Mathematical Olympiads 2003*, Andreescu, T., Feng, Z, and Loh, P.-S., editors, MAA, 2004.
- *Mathematical Olympiads 2001-2002: Problems and Solutions from Around the World*, Andreescu, T., Feng, Z, and Loh, P.-R., editors, MAA, 2004.

- *Mathematical Olympiads 2000-2001: Problems and Solutions from Around the World*, Andreescu, T., Feng, Z, and Lee, G., Jr., editors, MAA, 2003.
- *Mathematical Olympiads 1999-2000: Problems and Solutions from Around the World*, Andreescu, T., and Feng, Z, editors, MAA, 2001.
- *Mathematical Olympiads 1998-1999: Problems and Solutions from Around the World*, Andreescu, T., and Feng, Z, editors, MAA, 2000.

Grants/Fellowships:

- Sloan Fellowship (2017-2019)
- NSF Career Grant [Award ID 1553288] (2016-2021)
- NSF Postdoctoral Fellowship [Award number 1103688] (2011-2014)
- NSF Graduate Fellowship (2010-2011)
- NDSEG Graduate Fellowship (2007-2010)
- Goldwater Fellowship (2006-2007)
- Fellow Laureate (among top 4) of Davidson Institute for Talent Development for prodigious work in mathematics (2003).
- National Merit Scholar, National Merit Finalist (2003).

Awards and Honors:

- Conference on Computational Complexity Best paper award, 2013.
- IBM research Pat Goldberg Memorial Best Paper Award in Computer Science, Electrical Engineering and Math, 2010.
- Symposium on Principles of Database Systems Best Paper Award 2010.
- Conference on Computational Complexity Best Student Paper, 2010.
- Jon A. Bucsela prize for top senior in MIT's mathematics department, 2007.
- AMS/MAA/SIAM Frank and Brennie Morgan Prize for research by an undergraduate, 2007.
- Machtey Award for Best Student Paper at IEEE Symposium on Foundations of Computer Science, 2005.
- Member of 3 person COMAP Mathematical Contest in Modeling Team 2004, 2005, 2006, 2007. Achieved an "Outstanding" in 2005, 2006, 2007. Won the Ben Fusaro Award for most creative solution in 2004. Won the INFORMS Award in 2006. Won the SIAM Award in 2007.
- Putnam Fellow (among top 5) 2003, 2004, 2005, 2006 and a Member of MIT's 1st place Team in 2003, 2004 in the William Lowell Putnam Mathematical Competition.
- 2nd place, Math/Computer Sciences Section of National Junior Science and Engineering Symposium, 2003.

- Gold Medalist at International Mathematical Olympiad as Member of USA Team, 2003, 2002.
- Akamai Scholar for Perfect Score on USA Mathematical Olympiad, 2002.
- USAMO Award Winner (among top 12), 2003, 2002, 2001.
- Perfect Score on Asian-Pacific Mathematical Olympiad, 2003.
- USA Physics Olympiad Team qualifier (among top 24), 2003, 2002.
- Perfect score on Virginia Tech Intercollegiate Regional Mathematics Competition, 2002.
- Gold Medalist (among top 25) in USA Math Talent Search, 2000.
- Co-winner (one of 3) in University of Wisconsin Math Talent Search, 2000.
- USAMO and Mathematical Olympiad Summer Program qualifier (among top 30), 1999-2003.

Teaching:

Formal Instruction:

- Instructor for Math 11 (Probability and Statistics) at UCSD (Winter 2018)
- Instructor for CSE 203A (Randomized Algorithms) at UCSD (Fall 2017)
- Instructor for CSE 291 (Statistical Learning Theory) at UCSD (Spring 2017)
- Instructor for Math 96 (Putnam Seminar) at UCSD (Fall 2016, Fall 2017, Fall 2018)
- Instructor for Math 205 (Topics in Number Theory: Elliptic Curves) at UCSD (Winter 2016)
- Instructor for Math 184A (Combinatorics) at UCSD (Fall 2015, Fall 2016, Spring 2018)
- Instructor for CSE 291 (Analysis of Polynomial Threshold Functions) at UCSD (Spring 2015)
- Instructor for CSE 101 (Introduction to Algorithms) at UCSD (Winter 2015, Spring 2016, Spring 2017, Spring 2018)
- Instructor for Math 110 (Applied Number Theory and Field Theory) at Stanford (Spring 2014)
- Instructor for Math 113 (Linear Algebra and Matrix Theory) at Stanford (Fall 2013)
- Lecturer for two sections of Math 51 (Linear Algebra and Differential Multivariable Calculus) at Stanford (Winter 2013)
- Teaching Fellow (lecturer) for Math 21b (Linear Algebra/ Differential Equations) at Harvard (Fall 2009)
- Teaching Fellow for Math Xa (Precalc/Calc I) at Harvard (Fall 2008)
- TA (discussion section leader) for 18.03 (Differential Equations) at MIT (Spring 2007)
- TA for 18.022 (Honors Calc II) at MIT (Fall 2006)

Online Courses:

- Contributor to the Mastering Algorithmic Techniques Coursera specialization: https://www.coursera.org/specializations/data-structures-algorithms.
- Instructor for Art of Problem Solving AIME Problem Seminar class, 2005

Mentorship:

- Grad Students: Max Hopkins
- Mentoring a local high school student on a mathematical research project (2011-2013)
- Instructor at the Math Olympiad Summer Program (June 2011)
- Helped Teach the Harvard Mathematics Department's Quals Tutorials, (Spring 2008, Fall 2008, Spring 2009, Fall 2009, Spring 2010)

Service:

- Co-organized workshop in Computational Efficiency & High Dimensional Robust Statistics, sponsored by TTI-Chicago, August 2018.
- Program Committee for RANDOM 2018.
- On NSF panel in 2016, 2018.
- Program Committee for Symposium On Discrete Algorithms (SODA) 2016, 2018.
- USA Mathematical Olympiad grader, 2010,2011.
- Helped proctor/grade the Harvard-MIT Mathematics Tournament, 2004-2008
- *Ad Hoc* reviewer for:
    - Journals: *Integers: the Electronic Journal of Combinatorial Number Theory; Proceedings of the American Mathematical Society; Comptes Rendus Mathematique; Bulletin of the London Mathematical Society; SIAM Journal on Computing; ACM Transactions on Algorithms; Algebra and Number Theory; Annals of Combinatorics; Archiv der Mathematik; Journal Applicable Analysis and Discrete Mathematics; Journal of Combinatorial Optimization; Chicago Journal of Theoretical Computer Science; Israel Journal of Mathematics; Forum Mathematicum; Comptes Rendus a Académie des Sciences*
    - Conferences: *Symposium on Theory Of Computing (STOC); Computational Complexity (CCC); Symposium on Discrete Algorithms (SODA); ACM Symposium on Principles of Database Systems(PODS); Innovations in Theoretical Computer Science (ITCS)*
    - Grant Evaluation: *Assisted in evaluation of a grant for the Army Research Office*

Society Memberships:

- Association for Computing Machinery
- American Mathematical Society
- Mathematical Association of America