Curriculum Vitae

Lenny Fukshansky

Address

Department of Mathematics
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Personal

- Citizenship: USA
- Born in Leningrad, Russia
- Fluent in Russian (native) and English languages
- Member of AMS (American Mathematical Soicety)
- Founding member of AMR (Association for Mathematical Research)

Education

- Ph.D. in Mathematics, August 2004

  University of Texas at Austin
  Advisor: Prof. J. D. Vaaler
  Thesis: *Algebraic points of small height with additional arithmetic conditions*

- B.S. in Applied Mathematics with Specialization in Computing, 1995

  University of California at Los Angeles

Professional Experience

- Professor, Claremont McKenna College, May 2015 - present
- Chair of the Department of Mathematical Sciences, Claremont McKenna College, July 2012 - July 2014
- Associate Professor (with tenure), Claremont McKenna College, December 2009 - May 2015
- Member of Extended Graduate Faculty, Claremont Graduate University, July 2007 - present
- Assistant Professor, Claremont McKenna College, July 2007 - December 2009
- Visiting Assistant Professor, Texas A&M University, September 2004 - August 2007
- Assistant Instructor and Teaching Assistant, University of Texas at Austin, September 1998 - August 2004
- Teaching Assistant, University of Nebraska at Lincoln, Spring 1998

- Software Engineer, IBM, General Magic, Compuware, and Compaq corporations, 1995 - 1998

Visiting Positions

- Oberwolfach Research Institute for Mathematics, Research in Pairs Program, July/August 2017
- Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, October/November 2014
- Institut Mittag-Leffler (IML), Djursholm, Sweden, July/August 2013
- Max Planck Institut für Mathematik (MPIM), Bonn, Germany, July 2012
- Institut des Hautes Etudes Scientifique (IHES), Bures-sur-Yvette, France, October/November 2010
- Max Planck Institut für Mathematik (MPIM), Bonn, Germany, June 2008
- Institut des Hautes Etudes Scientifique (IHES), Bures-sur-Yvette, France, July 2007
- Max Planck Institut für Mathematik (MPIM), Bonn, Germany, July/August 2006

Invited Research Visits

- ETH Zürich, Switzerland, 1 week in October 2018
- ETH Zürich, Switzerland, 1 week in November 2014
- Wesleyan University, Middletown, CT, USA, 1 week in July 2011
- Nanyang Technological University, Singapore, 2 weeks in May 2009
- Wesleyan University, Middletown, CT, USA, 2 weeks in July/August 2008

Research Interests

Number theory, arithmetic geometry, discrete and convex geometry, in particular:

- Diophantine approximation, equations, and problems
- Classical and adelic geometry of numbers
- Quadratic and linear forms; polynomials
- Theory of height functions, rational points on varieties, Mahler's measure, and connections with arithmetic geometry
- Geometric combinatorics, lattice point counting, Erhart polynomial
- Lattices, packings and coverings, linear Diophantine problem of Frobenius

Publications

1. Small zeros of quadratic forms with linear conditions, *Journal of Number Theory*, vol. 108 no. 1 (2004), pg. 29-43
2. Lattice points in homogeneously expanding compact domains, One section of the omnibus Problems Article "Problems from the Cottonwood Room" (M. Beck, B. Chen, L. Fukshansky, C. Haase, A. Knutson, B. Reznick, S. Robins, A. Schuermann), *Contemporary Mathematics* 374 (2005), 179-191, Proceedings of the Summer 2003 AMS/MAA/SIAM Conference on Integer Points in Polyhedra
3. Integral points of small height outside of a hypersurface, *Monatshefte für Mathematik,* vol. 147 no. 1 (2006), pg. 25-41
4. Siegel's lemma with additional conditions, *Journal of Number Theory*, vol. 120 no. 1 (2006), pg. 13-25
5. (with Sinai Robins) Frobenius problem and the covering radius of a lattice, *Discrete and Computational Geometry*, vol. 37 no. 3 (2007), pg. 471-483

6. On effective Witt decomposition and Cartan-Dieudonné theorem, *Canadian Journal of Mathematics*, vol. 59 no. 6 (2007), pg. 1284-1300

7. Small zeros of quadratic forms over the algebraic closure of **Q**, *International Journal of Number Theory*, vol. 4 no. 3 (2008), pg. 503-523

8. On distribution of well-rounded sublattices of Z^2, *Journal of Number Theory*, vol. 128 no. 8 (2008), pg. 2359-2393

9. On similarity classes of well-rounded sublattices of Z^2, *Journal of Number Theory*, vol. 129 no. 10 (2009), pg. 2530-2556

10. Search bounds for zeros of polynomials over the algebraic closure of **Q**, *Rocky Mountain Journal of Mathematics*, vol. 39, no. 3 (2009), pg. 789-804

11. Effective structure theorems for symplectic spaces via height, in "Quadratic forms -- algebra, arithmetic, and geometry" (R. Baeza, W.K. Chan, D.W. Hoffmann, and R. Schulze-Pillot, eds.), Contemporary Mathematics 493 (2009), pg. 117--130

12. Integral orthogonal bases of small height for real polynomial spaces, *Online Journal of Analytic Combinatorics*, vol. 4 (2009), art. 7, 10 pp.

13. (with Wai Kiu Chan) Small zeros of hermitian forms over quaternion algebras, *Acta Arithmetica*, vol. 142 no. 3 (2010), pg. 251--266

14. Algebraic points of small height missing a union of varieties, *Journal of Number Theory*, vol. 130 no. 10 (2010), pg. 2099--2118 -- an earlier version of this paper also appears in the MPIM Preprint Series

15. (with D. Moore, A. Ohana, W. Zeldow) On well-rounded sublattices of the hexagonal lattice, *Discrete Mathematics*, vol. 310 no. 23 (2010), pg. 3287--3302

16. Revisiting the hexagonal lattice: on optimal lattice circle packing, *Elemente der Mathematik*, vol. 66 no. 1 (2011) pg. 1--9

17. (with Sinai Robins) Bounds for solid angles of lattices of rank three, *Journal of Combinatorial Theory A*, vol. 118 no. 2 (2011), pg. 690--701

18. (with Achill Schuermann) Bounds on generalized Frobenius numbers, *European Journal of Combinatorics,* vol. 32 no. 3 (2011) pg. 361--368

19. (with Kate Petersen) On well-rounded ideal lattices, *International Journal of Number Theory*, vol. 8 no. 1 (2012) pg. 189--206

20. (with G. Henshaw, P. Liao, M. Prince, X. Sun, S. Whitehead) On integral well-rounded lattices in the plane, *Discrete and Computational Geometry,* vol. 48 no. 3 (2012), pg. 735--748

21. (with Iskander Aliev and Martin Henk) Generalized Frobenius numbers: bounds and average behavior, *Acta Arithmetica*, vol. 155 no. 1 (2012), pg. 53--62

22. (with G. Henshaw, P. Liao, M. Prince, X. Sun, S. Whitehead) On well-rounded ideal lattices - II, *International Journal of Number Theory,* vol. 9 no. 1 (2013) pg. 139--154

23. Heights and quadratic forms: on Cassels' theorem and its generalizations, in "Diophantine methods, lattices, and arithmetic theory of quadratic forms" (W. K. Chan, L. Fukshansky, R. Schulze-Pillot, and J. D. Vaaler, eds.), *Contemporary Mathematics*, AMS vol. 587 (2013), pg. 77--94

24. (with Glenn Henshaw) Lattice point counting and height bounds over number fields and quaternion algebras, *Online Journal of Analytic Combinatorics*, vol. 8 (2013), art. 4, 20 pp.

25. Well-rounded zeta-function of planar arithmetic lattices, *Proceedings of the American Mathematical Society,* vol. 142 no. 2 (2014), pg. 369--380

26. (with Wai Kiu Chan and Glenn Henshaw) Small zeros of quadratic forms missing a union of varieties, *Transactions of the AMS*, vol. 366 no. 10 (2014), pg. 5587--5612

27. (with Hiren Maharaj) Lattices from elliptic curves over finite fields, *Finite Fields and Their Applications*, vol. 28 (July 2014), pg. 67--78

28. (with Xun Sun) On the geometry of cyclic lattices, *Discrete and Computational Geometry*, vol. 52 no. 2 (2014), pg. 240--259

29. Stability of ideal lattices from quadratic number fields, *The Ramanujan Journal*, vol. 37 no. 2 (2015), pg. 243--256

30. (with Albrecht Boettcher, Stephan Garcia, and Hiren Maharaj) Toeplitz determinants with perturbations in the corners, *Journal of Functional Analysis*, vol. 268 no. 1 (2015), pg. 171--193

31. (with Albrecht Boettcher, Stephan Garcia, and Hiren Maharaj) On lattices generated by finite Abelian groups, *SIAM Journal on Discrete Mathematics*, vol. 29 no. 1 (2015), pg. 382--404

32. (with Stephan Garcia and Xun Sun) Permutation invariant lattices, *Discrete Mathematics*, vol. 338 no. 8 (2015), pg. 1536--1541

33. Height bounds on zeros of quadratic forms over Q-bar, *Research in Mathematical Sciences*, vol. 2 no. 1 (2015), art. 19, 26 pp.

34. (with Wai Kiu Chan and Glenn Henshaw) Totally isotropic subspaces of small height in quadratic spaces, *Advances in Geometry,* vol. 16 no. 2 (2016), pg. 153--164

35. (with Albrecht Boettcher, Stephan Garcia, and Hiren Maharaj) Lattices from Hermitian function fields, *Journal of Algebra*, vol. 447 (2016), pg. 560--579

36. (with Albrecht Boettcher, Stephan Garcia, Hiren Maharaj, and Deanna Needell) Lattices from tight equiangular frames, *Linear Algebra and its Applications*, vol. 510 (2016), pg. 395--420

37. (with Albrecht Boettcher, Stephan Garcia, and Hiren Maharaj) Lattices from Abelian groups, in "Lattices and Applications in Number Theory," *Oberwolfach Reports*, vol. 13 no. 1 (2016), pg. 87--154

38. (with Pavel Guerzhoy and Florian Luca) On arithmetic lattices in the plane, *Proceedings of the American Mathematical Society*, vol. 145 no. 4 (2017), pg. 1453--1465

39. (with Albrecht Boettcher) Addendum to: Lattices from tight equiangular frames, *Linear Algebra and its Applications*, vol. 531 (2017), pg. 592--601

40. (with Albrecht Boettcher, Stephan Garcia, and Hiren Maharaj) Lattice theory and Toeplitz determinants, *Operator Theory: Advances and Applications*, vol. 262 (2018), pg. 117--138

41. (with Adib Shaar) A new family of one-coincidence sets of sequences with dispersed elements for frequency hopping CDMA systems, *Advances in Mathematics of Communications*, vol. 12 no. 1 (2018), pg. 181--188

42. (with Nikolay Moshchevitin) On an effective variation of Kronecker's approximation theorem avoiding algebraic sets, *Proceedings of the American Mathematical Society*, vol. 146 no. 10 (2018), pg. 4151--4163 -- an extended version of this paper (also joint with O. German) appears in the Oberwolfach preprint series

43. (with Deanna Needell and Benny Sudakov) An algebraic perspective on integer sparse recovery, *Applied Mathematics and Computation*, vol. 340 (2019), pg. 31--42

44. (with Albrecht Boettcher, Simon Eisenbarth, Stephan Garcia, and Hiren Maharaj) Spherical 2-designs and lattices from Abelian groups, *Discrete and Computational Geometry,* vol. 61 no. 1 (2019) pg. 123--135

45. (with Wai Kiu Chan) Small representations of integers by integral quadratic forms, *Journal of Number Theory*, vol. 201 (2019) pg. 40--52

46. (with Taoufiq Damir) Canonical basis twists of ideal lattices from real quadratic number fields, *Houston Journal of Mathematics*, vol. 45 no. 4 (2019) pg. 999--1019

47. (with Deanna Needell, Josiah Park and Jessie Xin) Lattices from tight frames and vertex transitive graphs, *Electronic Journal of Combinatorics*, vol. 26 no. 3 (2019), P3.49, 30 pp.

48. (with Ed Shi) Positive semigroups and generalized Frobenius numbers over totally real number fields, *Moscow Journal of Combinatorics and Number Theory*, vol. 9 no. 1 (2020) pg. 29--41

49. (with Soren Aletheia-Zomlefer and Stephan Garcia) The Bateman-Horn conjecture: Heuristic, history, and applications, *Expositiones Mathematicae,* vol. 38 no. 4 (2020), pg. 430--479

50. (with Albrecht Boettcher) Representing integers by multilinear polynomials, *Research in Number Theory*, vol. 6 no. 4 (2020), Article #38

51. (with Alex Hsu) Covering point-sets with parallel hyperplanes and sparse signal recovery, to appear in *Discrete and Computational Geometry*

52. (with David Kogan) <u>On the geometry of nearly orthogonal lattices</u>, *Linear Algebra and its Applications,* vol. 629 (2021), pg. 112--137
53. (with Pavel Guerzhoy and Stefan Kuehnlein) <u>On sparse geometry of numbers</u>, *Research in the Mathematical Sciences*, vol. 8 no. 1 (2021), Article #2
54. (with Maxwell Forst) <u>Counting basis extensions in a lattice</u>, submitted for publication
55. (with David Kogan) <u>On average coherence of cyclotomic lattices</u>, to appear in *Communications in Mathematics*
56. (with Siki Wang) <u>Positive semigroups in lattices and totally real number fields</u>, to appear in *Advances in Geometry*
57. (with David Kogan) <u>Cyclic and well-rounded lattices</u>, submitted for publication

Book

- (with Stephan Garcia) <u>Geometric Number Theory</u>, under contract with *Cambridge University Press*

Editorial

- Chebyshevskii Sbornik, an editor (2019 - present)
- Online Journal of Analytic Combinatorics, an editor (2013 - present)
- "Diophantine methods, lattices, and arithmetic theory of quadratic forms" -- proceedings of a BIRS workshop (Editors: W. K. Chan, L. Fukshansky, R. Schulze-Pillot, J. D. Vaaler), *Contemporary Mathematics*, AMS vol. 587 (2013)

Honors, Awards, Scholarships, Funding

- Convocation Speaker, Claremont McKenna College, September 2018
- Simons Foundation Collaboration Grant for Mathematicians, 2017-2022
- National Security Agency, Young Investigator Grant, 3/2015 - 3/2017
- Simons Foundation Collaboration Grant for Mathematicians, 2013-2018 (terminated in 2015 due to NSA grant)
- National Security Agency, Young Investigator Grant, 2/2012 - 2/2014
- Simons Foundation Collaboration Grant for Mathematicians, 2011-2016 (terminated in 2012 due to NSA grant)
- Number Theory Foundation conference grant: travel support for the junior participants of a BIRS workshop, November 2011
- Faculty Research Grants, Claremont McKenna College, multiple awards 2008 - present
- Senior personnel on NSF grant DMS-0755540: REU program for Claremont Colleges, 2008-2011
- Teaching Resource Center mini-grant, Claremont McKenna College, Spring 2008
- AMS/NSF travel grant for ICM 2006, August 2006
- NSF VIGRE postdoctoral fellowship, Texas A&M University, 2004-2005
- Graduate Research Assistantship, University of Texas at Austin, Summer 2002
- NSF VIGRE traveling support, University of Texas at Austin, December 2001
- Dodd Teaching Excellence Award, Department of Mathematics, University of Texas at Austin, 2000
- First year summer fellowship, Department of Mathematics, University of Texas at Austin, 1999
- CalGrant Scholarship, University Scholarship, and College of Letters and Science Honors, UCLA, 1992-1993

Invited talks

- Representing integers by multilinear polynomials, Selected Topics in Mathematics online seminar, University of Liverpool, UK (October 29, 2021)
- On sparse geometry of numbers, Diophantine Analysis and Related Topics, online conference at Moscow State University, Russia (May 31 - June 5, 2021)
- Representing integers by multilinear polynomials, Diophantine Analysis online seminar, Moscow State University, Russia (April 8, 2021)
- Lattices from group frames and vertex transitive graphs, Algebra Seminar, Florida State University, Tallahassee, Florida (November 20, 2019)
- Heights and quadratic forms, Colloquium, University of Texas Rio Grande Valley, Edinburg, Texas (November 19, 2019)
- Lattices from group frames and vertex transitive graphs, Combinatorics Seminar, University of Texas Rio Grande Valley, Brownsville, Texas (November 18, 2019)
- Bounds on linear forms and integer sparse recovery, Baikal Number Theory Conference, Olkhon Island, Russia (August 26 - 30, 2019)
- Lattices from group frames and vertex transitive graphs, Number Theory Seminar, Moscow State University, Russia (August 23, 2019)
- Lattices from group frames and vertex transitive graphs, Southern Illinois University Conference on Pure Mathematics, Carbondale, IL (May 14 - 16, 2019)
- An algebraic perspective on integer sparse recovery, Combinatorics Seminar, UCLA, (May 9, 2019)
- Bounding linear forms on a lattice away from zero, Conference on the Arithmetic Theory of Quadratic Forms, Seoul National University (January 7 - 11, 2019)
- Small representations of integers by integral quadratic forms, Algebra, Number Theory, and Discrete Mathematics Seminar, Cal State Northridge (November 14, 2018)
- An algebraic perspective on integer sparse recovery, Combinatorics Seminar, USC, Los Angeles, CA (October 31, 2018)
- An algebraic perspective on integer sparse recovery, Theory of Combinatorial Algorithms Seminar, ETH Zurich, Zurich, Switzerland (October 25, 2018)
- Lattices generated by equiangular tight frames, Workshop on Computational Challenges in the Theory of Lattices, ICERM Brown (April 23 - 27, 2018)
- An effective variation of Kronecker's approximation theorem, AMS Special Session: *A Showcase of Number Theory at Liberal Arts Colleges*, San Diego, CA (January 10 - 11, 2018)
- On some algebraic lattice constructions, Number Theory Seminar, Texas A&M University, College Station, TX (September 8, 2017)
- Solving systems of quadratic equations over Q-bar, AMS Special Session: *Numbers, Functions, Transcendence and Geometry*, Denton, TX (September 9 - 10, 2017)
- On two constructions of extremal lattices, Vilnius Conference in Combinatorics and Number Theory, Vilnius, Lithuania (July 17 - 22, 2017)
- Lattices generated by equiangular tight frames, Combinatorics Seminar, UCLA, (June 1, 2017)
- On some algebraic constructions of extremal lattices, Combinatorics Seminar, Caltech (February 22, 2017)
- On some algebraic constructions of extremal lattices, Number Theory Seminar, UC Irvine (October 18, 2016)
- Lattices from Abelian groups, spherical designs, and packing density maxima, Operations Research Seminar, Cardiff University, Cardiff, UK (July 13, 2016)
- Generalized Frobenius numbers: bounds and average behavior via geometric techniques, International meeting on numerical semigroups with applications, Levico Terme, Italy (July 4 - 8, 2016)

- Well-rounded lattices from algebraic constructions, Sabanci University, Istanbul, Turkey (June 8, 2016)
- Well-rounded lattices from algebraic constructions, ANTA Seminar, Aalto University, Helsinki, Finland (June 5, 2016)
- On arithmetic lattices in the plane, Southern Illinois University Conference on Pure Mathematics, Carbondale, IL (May 15 - 17, 2016)
- On lattices generated by finite Abelian groups, Southern California Discrete Math Symposium 2016, UCLA, April 16, 2016
- Lattices from Abelian groups, Workshop on "Lattices and Applications in Number Theory", Oberwolfach, Germany (January 17 - 23, 2016)
- Height bounds for zeros of quadratic forms, Diophantine Approximation and Related Topics, Aahrus, Denmark (July 13 - 17, 2015)
- Solving quadratic equations over Q-bar, Algebra, Number Theory, and Discrete Mathematics Seminar, Cal State Northridge (April 29, 2015)
- Height bounds on zeros of quadratic forms over Q-bar, AMS Special Session: *Quadratic Forms in Arithmetic and Geometry*, AMS Spring Western Section Meeting, Huntsville, AL, March 2015
- Searching for rational points on varieties over global fields, University of Göttingen, Germany (November 16-22, 2014)
- On the Frobenius problem and its generalization, Theory of Combinatorial Algorithms Seminar, ETH Zürich, Switzerland, November 11, 2014
- Well-rounded lattices from algebraic constructions, TU Berlin, November 5, 2014
- Well-rounded lattices from algebraic constructions, plenary lecture at the Workshop on "Sphere Packings, Lattices, and Designs", Program on "Minimal Energy Point Sets, Lattices, and Designs", Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria (October 27-31, 2014)
- On stability of ideal lattices from quadratic number fields, ICM 2014 Satellite Conference on Integral Quadratic Forms and Related Topics, Gyeongju, South Korea (August 7-11, 2014)
- Computational complexity of lattice problems and cyclic lattices, 2014 Undergraduate Summer Research Program Polygons and Polynomials, ICERM - Brown University, July 28, 2014
- Heights and effective theory of quadratic forms over global fields, University of Colorado at Boulder, Number Theory seminar, Boulder, Colorado (April 3, 2014)
- Well-rounded lattices from algebraic constructions, International Conference on The Algebraic and Arithmetic Theory of Quadratic Forms 2013, Puerto Natales, Patagonia, Chile (December 16-21, 2013)
- Computational complexity of lattice problems and cyclic lattices, Colloquium, California State University Dominguez Hills, October 2013
- Complexity of lattice problems on cyclic lattices, Combinatorics Seminar, UCLA, February 2013
- On the geometry of cyclic lattices, Algebra and Discrete Mathematics Seminar, UC Davis, Davis, CA, February 2013
- Computational complexity of lattice problems and cyclic lattices, Graduate Seminar, California State University Channel Islands, Camarillo, CA, February 2013
- On integral well-rounded lattices, Number Theory Seminar, Max Planck Institut für Mathematik, Bonn, Germany, July 2012
- On integral well-rounded lattices, Mathematics Colloquium, Karlsruhe Institute of Technology, Karlsruhe, Germany, July 2012
- On the Frobenius problem and its generalization, Number Theory Seminar, Universitaet des Saarlandes, Saarbruecken, Germany, July 2012
- On minimal lattice spherical configurations in three dimensions, Analysis Seminar, California State University Fullerton, April 2012

- Search bounds with respect to height in linear and quadratic spaces, Minisymposium: *Arithmetic aspects of numerical solving* at the SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh, North Carolina (October 6-9, 2011)
- On the Frobenius problem and its generalization, Colloquium, California State University Dominguez Hills, September 2011
- On minimal lattice spherical configurations in three dimensions, Combinatorics Seminar, UCLA, May 2011
- On distribution of integral well-rounded lattices in the plane, Special Session: *Arithmetic of quadratic forms and integral lattices* at the First Joint Meeting of AMS and Sociedad Mathematica de Chile, Pucon, Chile (December 15-18, 2010)
- Heights and effective theory of quadratic forms over global fields, Workshop on the arithmetic of quadratic forms and integral lattices, Lake Ranco, Chile (December 13-14, 2010)
- Searching for rational points on varieties over global fields, Colloquium, Uppsala University, November 2010
- On Siegel's lemma outside of a union of varieties, Oberseminar des Institutes für Algebra und Geometrie, University of Magdeburg, November 2010
- On the Frobenius problem and its generalization, Colloquium, University of Rostock, November 2010
- Small zeros of hermitian forms over quaternion algebras, Number Theory Seminar, Institut de Mathématiques de Jussieu, Paris, France, October 2010
- On the Frobenius problem and covering radius of a lattice, Combinatorics Seminar, UCLA, May 2010
- On distribution of well-rounded lattices in the plane, Number Theory Seminar, UC Irvine, March 2010
- Small zeros of hermitian forms over quaternion algebras, AMS-KMS Special Session: *Arithmetic of quadratic forms*, First Joint Meeting of AMS and Korean Mathematical Society, Seoul, South Korea (December 16-20, 2009) -- CANCELLED
- On the Frobenius coin-exchange problem, Graduate Seminar, California State University Channel Islands, Camarillo, CA, September 2009
- Points of small height missing a union of varieties, AMS Special Session: *Algebra and Number Theory with Polyhedra*, AMS Spring Western Section Meeting, San Francisco, CA, February 2009
- Siegel's lemma outside of a union of varieties, AMS Special Session: *Number Theory*, AMS Fall Eastern Section Meeting, Middletown, CT, October 2008
- On distribution of well-rounded sublattices of Z^2, Séminaire de Théorie des Nombres, Institut de Mathématiques de Bordeaux, University of Bordeaux, France, June 2008
- On similarity classes of well-rounded sublattices of Z^2, Oberseminar des Institutes für Algebra und Geometrie, University of Magdeburg, Germany, June 2008
- On zeta function of well-rounded sublattices of Z^2, Number Theory Seminar, Institut de Mathématiques de Jussieu, Paris, France, May 2008
- Sphere packing, lattices, and Epstein zeta function, Colloquium, California State University at Los Angeles, April 2008
- Sphere packing, lattices, and Epstein zeta function, Colloquium, California State University at Northridge, March 2008
- Frobenius number, covering radius, and well-rounded lattices, AMS Special Session: *The linear Diophantine problem of Frobenius*, Joint Mathematics Meeting, San Diego, CA, January 2008
- Effective structure theorems for quadratic spaces via height, Second International Conference on The Algebraic and Arithmetic Theory of Quadratic Forms 2007, Lake Llanquihue, Chile, December 2007
- Sphere packing, lattices, and Epstein zeta function, Claremont Mathematics Colloquium, Claremont Colleges, November 2007

- Effective theorems for quadratic spaces via height, Number Theory Seminar, UCLA, October 2007
- Frobenius number, covering radius, and well-rounded lattices, Colloquium, George Mason University, February 2007
- Frobenius number, covering radius, and well-rounded lattices, Colloquium, Bucknell University, February 2007
- Frobenius number, covering radius, and well-rounded lattices, Colloquium, Claremont McKenna College, January 2007
- Effective decompositions of quadratic spaces via heights, Number Theory Seminar, Max Planck Institut für Mathematik - Bonn, July 2006
- Frobenius number, covering radius, and ESM lattices, Number Theory Seminar, University of Göttingen, June 2006
- Quadratic forms and height functions, Colloquium of the Graduiertenkolleg, University of Göttingen, June 2006
- On the linear Diophantine problem of Frobenius, Oberseminar des Institutes für Algebra und Geometrie , University of Magdeburg, June 2006
- On the Frobenius problem, Algebra-Geometry-Combinatorics Seminar, San Francisco State University, May 2006
- Frobenius number of ESM lattices, Number Theory Seminar, University of Texas at Austin, February 2006
- The Frobenius problem and the covering radius of a lattice, Colloquium, Temple University, February 2006
- Effective theorems for quadratic spaces over the algebraic closure of **Q**, AMS Special Session on Mahler Measure and Heights, Joint Mathematics Meeting, San Antonio, TX, January 2006
- Effective structure theorems for quadratic spaces and their isometries, Number Theory Seminar, University of Illinois at Urbana-Champaign, February 2005
- Heights and Diophantine problems, Colloquium, Rice University, September 2004
- Small zeros of quadratic polynomials, Number Theory Seminar, Texas A&M University, November 2003
- Small zeros of quadratic forms with linear conditions, Mahler's Measure of Polynomials Conference, Simon Fraser University, June 2003

Contributed talks

- On sparse geometry of numbers, AustMS 2020 Meeting Online, Special Session on Number Theory and Algebraic Geometry, December 2020
- Orthogonal Siegel's lemma, Illinois Number Theory Conference, May 2010
- Algebraic points of small height missing a union of varieties, Western Number Theory Conference, Fort Collins, CO, December 2008
- Siegel's lemma outside of a union of varieties, Number Theory Seminar, UCLA, November 2008
- On distribution of well-rounded sublattices of Z^2, CNTA10, Waterloo, Canada, July 2008
- Effective theorems for quadratic spaces via height, Seminaire de theorie des nombres de Chevaleret, Institut de Mathématiques de Jussieu, Paris, France, July 2007
- On distribution of integral well-rounded lattices in dimension two, Illinois Number Theory Fest, May 2007
- Effective theorems for quadratic spaces, ICM 2006, Madrid, Spain, August 2006
- Frobenius problem and the covering radius of a lattice, West Coast Number Theory, Pacific Grove, CA, December 2005
- Some effective Diophantine results over the algebraic closure of **Q**, XXIVth Journées Arithmétiques, Marseilles, France, July 2005
- Effective decompositions of quadratic spaces, ArithmeTexas, College Station, TX, April 2005

- Counting lattice points in admissible adelic sets, MNTCG2, Urbana-Champaign, IL, February 2005
- On effective Witt decomposition and Cartan-Dieudonné theorem, West Coast Number Theory Conference, Las Vegas, NV, December 2004
- Siegel's lemma with additional conditions, CNTA8, Toronto, June 2004
- Integral points of small height outside of a hypersurface, Illinois Number Theory Conference, Urbana-Champaign, May 2004
- Lattice points of small height in projective varieties, Integer points in polyhedra, *Joint Summer research conferences*, Snowbird, Utah, July 2003
- On a discrete analogue of the Tarski plank problem, West Coast Number Theory Conference, SFSU, San Francisco, December 2002
- Points of small height outside of a collection of subspaces, CNTA7, Montreal, Canada, May 2002
- Small zeros of quadratic forms over a number field, West Coast Number Theory Conference, Pacific Grove, CA, December 2001

Educational and expository talks

- A difference in numbers, keynote lecture for the Center for Talented Youth Science and Technology event at Claremont McKenna College, October 2018
- The makings of a good problem: theory and applications, keynote address at the 72nd Annual Convocation, Claremont McKenna College, September 2018
- A difference in numbers, invited lecture at GEMS: Gateway to Exploring Mathematical Sciences, Claremont Colleges, November 2017
- How to count to infinity: a combinatorial approach to geometry, a break-out session for the Center for Talented Youth Science and Technology event at Claremont McKenna College, March 2017
- How to count to infinity: a combinatorial approach to geometry, a break-out session for the Center for Talented Youth Science and Technology event at Claremont McKenna College, October 2015
- Math for the New Millennium: Ideas that Change the World, a panel presentation at the Marian Miner Cook Athenaeum, Claremont McKenna College (joint with A. Aksoy, B. Hunter, and C.-Y. Kao), October 2015
- A Challenge for the Millennium: the Million Dollar Problems in Mathematics, a panel presentation at the Marian Miner Cook Athenaeum, Claremont McKenna College (joint with M. Huber, D. Needel, and S. Nelson), April 2013
- The kissing number problem: from Newton and Gauss to the present day, a lecture in the Claremont McKenna College Math Club, March 2013
- Math in the grocery aisle: from stacking oranges to constructing error-correcting codes, invited lecture at GEMS: Gateway to Exploring Mathematical Sciences, Claremont Colleges, February 2009
- Mahler's measure and Lehmer's conjecture, Mathematics Graduate Student Organization Seminar, Texas A&M University, October 2006
- Packing oranges and constructing error correcting codes, invited lecture to school students as a part of Math Awareness Month, Texas A&M University, April 2006
- Simultaneous Diophantine approximations and a conjecture of Minkowski, Introduction to Mathematical Research seminar series, University of Texas at Austin, March 2006
- Semester review of calculus, invited lecture to freshmen engineering students as a part of Texas A&M Leaders in Freshman Engineering final review series, December 2005
- Diophantine equations: the mystery of numbers, invited lecture to high school students as a part of Texas A&M Summer Honors Invitational Program (SHIP), June 2005

Local seminar talks

- Representing integers by multilinear polynomials, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2021
- Covering point-sets with parallel hyperplanes and sparse signal recovery, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2020
- Frobenius problem over number fields, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2019
- Lattices from group frames and vertex transitive graphs, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2019
- Algebraic approach to integer sparse recovery, Claremont Mathematics Weekend, January 2019
- Digital sequences for frequency hopping CDMA systems, Applied Mathematics Seminar, Claremont Colleges, November 2018
- Small representations of integers by integral quadratic forms, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2018
- An algebraic perspective on integer sparse recovery, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, October 2017
- Counting arithmetic lattices in the plane, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2017
- Constructing extremal lattices in Euclidean spaces, Claremont Mathematics Colloquium, Claremont Colleges, February 2017
- Some arithmetic constructions with equiangular frames, Claremont Mathematics Weekend, January 2017
- On effective variations of Kronecker's approximation theorem, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2016
- Arithmetic lattices and elliptic curves, Claremont Mathematics Weekend, January 2016
- Optimization problems on planar lattice transmitter networks, Applied Mathematics Seminar, Claremont Colleges, October 2015
- Solving quadratic equations over Q-bar, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2015
- On the Frobenius problem and its generalization, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, October 2014
- Well-rounded lattices from algebraic constructions, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2014
- Automorphism groups of lattices, Minkowski reduction domain, and well-rounded retract, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, April 2014
- Searching for rational points on varieties over global fields, Claremont Mathematics Colloquium, Claremont Colleges, February 2014
- On stability of ideal lattices from quadratic number fields, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, November 2013
- Complexity of lattice problems on cyclic lattices, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, April 2013
- On a counting problem in number theory, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, October 2012
- On zeta-function of well-rounded lattices in the plane, Analysis Seminar, Claremont Colleges, February 2012
- Lattices must be fat -- no skinny lattice for you!, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2012
- Integer knapsacks and the Frobenius problem, Statistics / Operations Research / Math Finance seminar, Claremont Colleges, April 2011

- <u>On well-rounded ideal lattices</u>, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, January 2011
- <u>Revisiting the hexagonal lattice: on optimal lattice circle packing</u>, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, February 2010
- <u>On minimal lattice spherical configurations in three dimensions</u>, Topology and Geometry seminar, Claremont Colleges, November 2009
- <u>Diophantine approximation on a circle</u>, Analysis Seminar, Claremont Colleges, April 2009
- <u>On heights of algebraic numbers</u>, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, March 2009
- <u>On Tarski plank problem and its discrete analogues</u>, Analysis Seminar, Claremont Colleges, November 2008
- <u>On Siegel's lemma</u>, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2008
- <u>On distribution of well-rounded sublattices of Z^2</u>, Analysis Seminar, Claremont Colleges, September 2008
- <u>Mahler's measure, Lehmer's conjecture, and some connections - II</u>, Analysis Seminar, Claremont Colleges, April 2008
- <u>Mahler's measure, Lehmer's conjecture, and some connections - I</u>, Analysis Seminar, Claremont Colleges, February 2008
- <u>On zeta function of well-rounded lattices</u>, Analysis Seminar, Claremont Colleges, November 2007
- <u>Hilbert's 10-th problem, heights, and search bounds for rational points on varieties, Parts I and II</u>, Algebra / Number Theory / Combinatorics Seminar, Claremont Colleges, September 2007
- <u>On the distribution of integral well-rounded lattices in dimension two, Part II</u>, Number Theory Seminar, Texas A&M University, February 2007
- <u>On the distribution of integral well-rounded lattices in dimension two, Part I</u>, Number Theory Seminar, Texas A&M University, September 2006
- <u>Effective theorems for quadratic spaces over Q-bar</u>, Number Theory Seminar, Texas A&M University, January 2006
- <u>The Frobenius problem and the covering radius of a lattice</u>, Number Theory Seminar, Texas A&M University, October 2005
- <u>Some effective Diophantine results over Q-bar</u>, Number Theory Seminar, Texas A&M University, April 2005
- <u>On effective Witt decomposition and Cartan-Dieudonné theorem</u>, Number Theory Seminar, Texas A&M University, September 2004
- <u>Points of small height with arithmetic conditions</u>, Number Theory Seminar, University of Texas at Austin, November 2003

Other special programs and conferences attended

- Arizona Winter School: *Special Functions and Transcendence*, Tucson, AZ, March 2008
- SMS-NATO ASI 2005: *Equidistribution in Number Theory*, Montreal, Canada, July 2005
- Arizona Winter School: *Number Theory and Physics*, Austin, TX, March 2004
- NSF-CBMS Special Program: *Web of Modularity*, Urbana, IL, June 2003
- MSRI Summer Program: *Excursions in Computational Number Theory - Polynomials with integer coefficients*, Vancouver, Canada, June 2002; <u>Project and presentation</u>: *Heights of products of cyclotomic polynomials*
- Illinois Number Theory Conference, Urbana, IL, May 2002
- Arizona Winter School: *Periods*, Tucson, AZ, March 2002

Research supervision

Postdoctoral fellows supervision

- David Krumm (at Claremont McKenna College), 2013 - 2015

Ph.D. students

- Glenn Henshaw, (joint with Wai Kiu Chan) Ph.D. from Wesleyan University, May 2012
- Xun Sun, Ph.D. from Claremont Graduate University, May 2015
- David Kogan, Ph.D. in progress at Claremont Graduate University
- Maxwell Forst, Ph.D. in progress at Claremont Graduate University

Ph.D. and M.S. thesis committee service

- Member of the Ph.D. Dissertation Committee for Ahmed Al Fares, Claremont Graduate University
- External Examiner for Jose Miguel Cruz's M.S. Thesis (Universidad de los Andes, M.S. July 2020)
- External Examiner for Santiago Cortes Gomez's M.S. Thesis (Universidad de los Andes, M.S. May 2018)
- External Examiner for Dilbak Mohammed's Ph.D. Dissertation (Cardiff University, Ph.D. December 2016)
- Gutachter/Expert Referee for Carsten Thiel's Ph.D. Dissertation (University of Magdeburg, Ph.D. February 2014)
- External Member of the Ph.D. Dissertation Committee for Nikolas Rauh (University of Texas at Austin, Ph.D. May 2013)
- External Member of the Ph.D. Dissertation Committee for Mark Rothlisberger (University of Texas at Austin, 2010)

Undergraduate thesis and research supervision

- Advisor for senior thesis student Siki Wang (Claremont McKenna College, B.A. expected May 2022, Best Thesis Award)
- Advisor for summer research and senior thesis student Yingqi (Ed) Shi (Claremont McKenna College, B.A. May 2020, Outstanding Math Major Award)
- Advisor for senior thesis student Alexander Hsu (Claremont McKenna College, B.A. December 2019, Best Thesis Award and Outstanding Math Major Award)
- Advisor for senior thesis student Yuxin (Jessie) Xin (Claremont McKenna College, B.A. May 2019)
- Advisor for senior thesis student Scott Maislin (Claremont McKenna College, B.A. May 2017)
- Advisor for senior thesis student Mia Siracusa (Scripps College, B.A. May 2017)
- Advisor for senior thesis student Michelle Goodwin (Claremont McKenna College, B.A. May 2016)
- Advisor for senior thesis student Emma Cranston (Scripps College, B.A. May 2016)
- Advisor for independent study students Joshua Corwin and Christian Modjaiso (Pitzer College, Summer 2015)
- Advisor for senior thesis student Tatiana Bradley (Scripps College, B.A. May 2015)

- Advisor for senior thesis student John Shaughnessy (Claremont McKenna College, B.A. May 2014, Best Thesis Award)
- Advisor for senior thesis and research student Michael Mei (Pomona College, B.A. May 2014)
- Advisor for research student Arvind Suresh (Claremont McKenna College, Spring and Summer 2013)
- Advisor for senior thesis student Jonathan Raiman (Pomona College, B.A. May 2013)
- Reader for senior thesis student Amanda Clemm (Scripps College, B.A. May 2012)

Research programs supervision

- Instructor and Project Leader for the Claremont Colleges Fletcher Jones Summer 2011 Research Program for graduate and undergraduate students, Summer 2011
- Instructor and Project Leader for an NSF-funded REU program, Claremont Colleges REU, 2009

Professional activities and service

Organizing activities

- Member of the scientific committee for the Southern California Discrete Mathematics Symposium, 2020 - present
- Co-organizer (with S. Assaf) of the Southern California Discrete Mathematics Symposium 2019, Claremont, California (May 4, 2019)
- Co-organizer (with S. Akhtari and C. Petsche) of <u>AMS Special Session: *Diophantine Approximation and Analytic Number Theory in Honor of Jeffrey Vaaler*</u> at the Joint Mathematics Meeting - 2018, San Diego, California (January 12 - 13, 2013)
- Co-organizer (with D. Krumm) of AMS Special Session: *Heights, Diophantine problems, and lattices*, Riverside, California (November 2-3, 2013)
- Co-organizer (with W. K. Chan) of <u>AMS Special Session: *Arithmetic theory of quadratic forms and lattices*</u> at the Joint Mathematics Meeting - 2013, San Diego, California (January 10, 2013)
- Co-organizer (with W. K. Chan, R. Schulze-Pillot, J. D. Vaaler) of a 5-day workshop on Diophantine methods, lattices, and arithmetic theory of quadratic forms, BIRS, Banff, Canada (November 13 - 18, 2011)
- Co-organizer (with S. Garcia) for the Claremont Mathematics Colloquium, Claremont Colleges, 2011-2012
- Co-organizer (with G. Karaali) for the Algebra / Number Theory / Combinatorics seminar, Claremont Colleges, 2009-present
- Co-organizer (with M. Beck) of AMS Special Session: *Diophantine problems and discrete geometry*, AMS Spring Western Section Meeting, Claremont, CA, May 2008
- Local organizer of AMS Spring Western Section Meeting, Claremont, CA, May 2008
- Organizer for the Number Theory seminar, Texas A&M University, 2006-2007
- Organizer for the Working Number Theory seminar, Texas A&M University, 2004 - 2005

Reviewing and refereeing service

- <u>Referee for the following journals</u>:
  - Journal of Number Theory
  - Canadian Mathematical Bulletin

- o International Journal of Number Theory
- o Mathematics of Operations Research
- o Journal of Combinatorial Theory A
- o Acta Arithmetica
- o Proceedings of the American Mathematical Society
- o Advances in Geometry
- o American Mathematical Monthly
- o Mathematica Bohemica
- o Geometriae Dedicata
- o Involve
- o Electronic Journal of Combinatorics
- o Proceedings of the London Mathematical Society
- o Journal de Théorie des Nombres de Bordeaux
- o Canadian Journal of Mathematics
- o SIAM Journal on Discrete Mathematics
- o Symposium on Discrete Algorithms
- o Mathematics of Computation
- o Alabama Journal of Mathematics
- o Houston Journal of Mathematics
- o Mathematical Intelligencer
- o Moscow Journal of Combinatorics and Number Theory
- o Communications in Mathematics
- o Pacific Journal of Mathematics
- o European Journal of Combinatorics
- o Advances in Mathematics of Communication
- o The Ramanujan Journal
- o Discrete Mathematics
- o Discrete and Computational Geometry
- o Cryptography and Communications
- o Computational and Applied Mathematics
- o Linear Algebra and its Applications
- o IMRN
- o Designs, Codes and Cryptography
- o Journal of Analysis
- o Combinatorial Theory
- o Integers
- o Expositiones Mathematicae
- o Monatshefte fur Mathematik

- Referee for the following proceedings:
  - o A Journey Through Discrete Mathematics
  - o IWOTA 2019 Proceedings

- Referee / reviewer for the following book publishers:
  - o Pearson Publishing
  - o W. H. Freeman Publishing
  - o Springer Developments in Mathematics Series
  - o Cambridge University Press
  - o American Mathematical Society

- Referee for the following grants and fellowships:

- o National Security Agency
- o Canada Council for the Arts: Killam Program
- o Marie Curie Actions: Career Integration Grant program
- o Davidson Fellows Scholarship program

- Reviewer for the following reviewing services:
  - o AMS Mathematical Reviews (MathSciNet)
  - o Zentralblatt MATH (zbMATH)

Special Teaching and Outreach Activities

- Member of a Zippia expert panel on current analytic job market trends, January 2021
- Judge for SOLVE 2019 competition of the Pasadena Unified School District Math Academy US, May 11, 2019 at CalTech
- 3rd Grade Math Circle at Chaparral Elementary School (Claremont, CA), AY 2018 - 2019
- Local organizer for Center for Talented Youth Science and Technology event at Claremont McKenna College, October 2018
- Judge for SOLVE 2018 competition of the Pasadena Unified School District Math Academy US, May 5, 2018 at CalTech
- Chaparral Elementary School Career Day presentation (Claremont, CA), February 23, 2018
- Judge for SOLVE 2017 competition of the Pasadena Unified School District Math Academy US, May 13, 2017 at CalTech
- Co-organizer (with D. Needell) of the CMC Math Club, 2013
- Co-organizer (with CMC Career Services) of the CMC Careers in Mathematics Event, 2012
- Co-organizer (with M. O'Neill) of the CMC 4th annual Atul Vyas Memorial Lecture in Mathematics, 2011
- Speaker for a GEMS (Gateway to Exploring Mathematical Sciences) event for middle school students, 2009
- Co-organizer (with M. O'Neill) of Putnam preparation seminar at Claremont McKenna, 2007, 2008
- Co-organizer (with M. O'Neill) of a mathematical problem-solving contest at Claremont McKenna, 2008
- Speaker and contest problem grader for Math Awareness event for elementary, middle, and high school students, 2006
- Assistant Instructor for an REU/VIGRE course, 2005
- Participated in Texas A&M Summer Honors Invitational Program (SHIP) for high school students, 2005
- Instructor for Emerging Scholars Program (ESP), 2001-2002
- Instructor for Supplemental Instruction Program (SI), 2001

Courses Taught

- Geometric Number Theory (advanced topics course), *Claremont McKenna College*, Instructor
- Coding Theory (advanced topics course), *Claremont McKenna College*, Instructor
- Number Theory and Connections to Computer Science, *Claremont McKenna College*, Instructor
- Transcendental Number Theory (advanced topics course), *Claremont McKenna College*, Instructor
- Algebraic Number Theory (advanced topics course), *Claremont McKenna College*, Instructor
- Abstract Algebra II: Galois Theory, *Claremont McKenna College*, Instructor
- Abstract Algebra I, *Claremont McKenna College*, Instructor

- Discrete Geometry (advanced topics course), *Claremont McKenna College*, Instructor
- Linear Algebra, *Claremont McKenna College*, Instructor
- Number Theory, *Claremont McKenna College*, Instructor
- Calculus I, II, III, Calculus III (regular and honors), *Claremont McKenna College*, Instructor
- Diophantine Approximations and Geometry of Numbers (graduate special topics course), *Texas A&M University*, Instructor
- Linear Algebra (Honors) for math and science majors, *Texas A&M University*, Instructor
- Linear Algebra for engineering majors, *Texas A&M University*, Instructor
- Analytic Geometry and Calculus for math and science majors, *Texas A&M University*, Instructor
- Engineering Calculus II (Honors), *Texas A&M University*, Instructor
- REU/VIGRE Course: Algebraic Methods in Computational Biology, *Texas A&M University*, Assistant Instructor
- Methods of Applied Mathematics I (graduate engineering course), *Texas A&M University*, Instructor
- Elementary Functions and Coordinate Geometry (Precalculus), *University of Texas at Austin*, Instructor
- Differential and Integral Calculus (first and second semesters), *University of Texas at Austin*, Teaching Assistant
- Calculus for Business and Economics, *University of Texas at Austin*, Teaching Assistant
- Differential Equations, *University of Texas at Austin*, Teaching Assistant

Lecture Notes (available on the webpage in PDF format)

- Geometric Number Theory: lecture notes for the special topics course at Claremont McKenna, Spring 2019
- Transcendental Number Theory: lecture notes for the special topics course at Claremont McKenna, Spring 2015
- Discrete Geometry: lecture notes for the special topics course at Claremont McKenna, Fall 2008 and Fall 2013
- Diophantine Approximation and Geometry of Numbers: lecture notes for the special topics course at Texas A&M, Spring 2006

Computing Skills

- Various UNIX-type operating systems, Windows, Mac OS
- C, C++, Java, SQL, and other programming languages
- TCP/IP, CGI, ASP, and other communication protocols
- DB2, Oracle, and other database systems