# DANIEL DADUSH

Networks & Optimization
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## EDUCATION

**Ph.D. in Algorithms, Combinatorics and Optimization (ACO)** *August 2012*
Georgia Institute of Technology, Atlanta, GA

- Advisor: Santosh S. Vempala, Distinguished Professor of Computer Science
- Thesis Title: Integer Programming, Lattice Algorithms, and Deterministic Volume Computation

**S.C.B. in Mathematics** *May 2006*
Brown University, Providence, RI

- Graduated Magna Cum Laude
- Elected to Phi Beta Kappa

## RESEARCH INTERESTS

- Lattice Algorithms and the Geometry of Numbers
- Linear Programming and the Simplex Method
- Extended Formulations
- Algorithms for Integer Programming, Cutting Plane Methods
- Convex Optimization
- Asymptotic Convex Geometry (properties of convex bodies as dimension tends to infinity)

## RESEARCH POSITIONS HELD

**Centrum Wiskunde & Informatica**, Amsterdam, Netherlands
*Senior Researcher and Group Leader*, Networks & Optimization Group *September 2014 – Present*

**New York University**, New York NY, USA
*Simons Postdoctoral Fellow*, Department of Computer Science *September 2012 – 2014*

**IBM Research - Watson**, Yorktown NY, USA
*Research Intern*, Algorithms Group *May 2011 – August 2011*

**Partner Institute for Computational Biology (PICB)**, Shanghai, China
*NSF EAPSI Fellow*, Department of Combinatorics and Geometry *June 2008 – August 2008*

**Georgia Institute of Technology**, Atlanta GA, USA
*Graduate Research Assistant*, School of Computer Science *January 2008 – June 2012*

**Journal Articles and Book Chapters**

1. S. Borst, D. Dadush, S. Huiberts, S. Tiwari. On the Integrality Gap of Binary Integer Programs with Gaussian Data. *Mathematical Programming*, 197, 1221–1263, 2023. Preliminary version in IPCO 2021.
2. D. Dadush, Z.K. Koh, B. Natura, L. Végh. An Accelerated Newton-Dinkelbach Method and its Application to Two Variables Per Inequality Systems. *Mathematics of Operations Researcher*, 2022, published online. Preliminary version in ESA 2021.
3. D. Dadush, S. Huiberts, Smoothed analysis of the Simplex method, in Beyond the Worst-Case Analysis of Algorithms, T. Roughgarden, ed., Cambridge University Press, Cambridge, December 2020.
4. D. Dadush, S. Huiberts. A Friendly Smoothed Analysis of the Simplex Method. *SIAM Journal on Computing*, Vol. 49, Issue 5, 2020. Special edition for STOC 2018.
5. D. Dadush, L. Végh, G. Zambelli. Geometric Rescaling Algorithms for Submodular Function Minimization. *Mathematics of Operations Research*, 2020, Vol. 45, No. 2, 732–754. Preliminary version in SODA 2018.
6. D. Dadush, L. Végh, G. Zambelli. Rescaling Algorithms for Linear Conic Feasibility. *Mathematics of Operations Research*, 45, 2, 732–754, 2020.
7. N. Bansal, D. Dadush, S. Garg, S. Lovett. The Gram-Schmidt Walk: A Cure for the Banaszczyk Blues. *Theory of Computing*, Vol. 15, Art. 21, 1-27, 2019. Preliminary version in STOC 2018.
8. D. Dadush, S. Garg, S. Lovett, S. Nikolov. Towards a Constructive Version of Banaszczyk's Vector Balancing Theorem. *Theory of Computing*, Vol. 15, Art. 15, 1-58, 2019. Special edition for APPROX-RANDOM 2016.
9. N. Bansal, D. Dadush, S. Garg. An Algorithm for Komlós Conjecture Matching Banaszczyk's bound. *SIAM Journal of Computing*, 48(2), 534-553, 2019. Special edition for FOCS 2016.
10. A. Campello, D. Dadush, C. Ling. AWGN-Goodness is Enough: Capacity-Achieving Lattice Codes based on Dithered Probabilistic Shaping. *IEEE Transactions on Information Theory*, vol. 65(3), pp. 1961-1971, 2019.
11. D. Dadush, N. Hähnle. On the Shadow Simplex Method for Curved Polyhedra. *Discrete & Computational Geometry*, 56, 882-909, 2016. Preliminary version in SOCG 2015.
12. D. Dadush, G. Kun. Lattice Sparsification and the Approximate Closest Vector Problem. *Theory of Computing*, Vol. 12, Art. 2, 1-34, 2016. Preliminary version in SODA 2013.
13. J. Briët, D. Dadush, S. Pokutta. On the existence of 0/1 polytopes with high semidefinite extension complexity. *Mathematical Programming, Series B*, 153, 179-199, 2015. Preliminary version in ESA 2013.
14. D. Dadush, S. Vempala. Near-Optimal Deterministic Algorithms for Volume Computation via M-Ellipsoids. Proceedings of the National Academy of Sciences, 110, 19237–19245, 2013.
15. D. Dadush. A Randomized Sieving Algorithm for Approximate Integer Programming. Algorithmica, 70, 208–244, 2014. Preliminary version in LATIN 2012.
16. D. Dadush, S.S. Dey, J.P. Vielma. On the Chvátal-Gomory Closure of a Compact Convex Set. *Mathematical Programming, Series A*, 145, 1, 327–348, 2014. Preliminary version in IPCO 2011. **INFORMS Optimization Society Student Paper Prize**, 2011.
17. D. Dadush, S.S. Dey, J.P. Vielma. The Chvátal-Gomory Closure of a Strictly Convex Body. *Mathematics of Operations Research*, 36, 227-239, 2011. **INFORMS JFIG Paper Competition Finalist**.
18. D. Dadush, S.S. Dey, J.P. Vielma. The Split Closure of a Strictly Convex Body. *Operations Research Letters*, 39, 121-126, 2011.

**Refereed Conference Proceedings**

1. D. Dadush, A. Leonard, L. Rohwedder, J. Verschae. Optimizing Low Dimensional Functions over the Integers. To appear in the *Proceedings of the 24th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2023.
2. D. Dadush. F. Eisenbrand, T. Rothvoss. From approximate to exact integer programming. To appear in the *Proceedings of the 24th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2023.
3. S. Borst, D. Dadush, D. Kashaev, S. Huiberts. A nearly optimal randomized algorithm for explorable heap selection. To appear in the *Proceedings of the 24th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2023.
4. S. Borst, D. Dadush, D. Mikulincer. Integrality Gaps for Random Integer Programs via Discrepancy. *Proceedings of the ACM Symposium on Discrete Algorithms (SODA)*, 2023.
5. D. Dadush, X. Allamigeon, G. Loho, B. Natura, L. Végh. Interior Point Methods are not Worst than Simplex. *Proceedings of the 63rd IEEE Symposium on the Foundations of Computer Science (FOCS)*, 2022.
6. D. Dadush, H. Jiang, V. Reis. A New Framework for Matrix Discrepancy: Partial Coloring Bounds via Mirror Descent. *Proceedings of the 54th ACM Symposium on Theory of Computing (STOC)*, 2022.
7. D. Dadush, Z.K. Koh, B. Natura, L. Végh. On Circuit Diameter Bounds via Circuit Imbalances. *Proceedings of the 23rd Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2022.
8. D. Dadush, S. Huiberts, C. Hojny, S. Weltge. A Simple Method for Convex Optimization in the Oracle Model. *Proceedings of the 23rd Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2022.
9. G. Bonnet, D. Dadush, U. Grupel, S. Huiberts, G. Livshyts. Asymptotic Bounds on the Combinatorial Diameter of Random Poytopes. *Proceedings of 38th International Symposium on Computational Geometry (SOCG)*, 2022.
10. D. Dadush, L. Végh, G. Zambelli. On Finding Exact Solutions of Linear Programs in the Oracle Model. *Proceedings of the ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2022.
11. D. Dadush, Z.K. Koh, B. Natura, L. Végh. An Accelerated Newton-Dinkelbach Method and its Application to Two Variables Per Inequality Systems. *Proceedings of the European Symposium on Algorithms (ESA)*, 2021.
12. S. Borst, D. Dadush, S. Huiberts, S. Tiwari. On the Integrality Gap of Binary Integer Programs with Gaussian Data. *Proceedings of the 22nd Conference on Integer Programming and Combinatorial Optimization (IPCO XXII)*, 2021.
13. S. Borst, D. Dadush, N. Olver, M. Sinha. Majorizer Measures for the Optimizer. *Proceedings of the 13th Conference on Innovations in Theoretical Computer Science (ITCS)*, 2021.
14. D. Dadush, B. Natura, L. Végh. Revisiting Tardos' Framework for Linear Programming: Faster Exact Solutions using Approximate Solvers. *Proceedings of the 61st Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2020.
15. D. Dadush, S. Tiwari. On the Complexity of Branching Proofs. *Proceedings of the Conference on Computational Complexity (CCC)*, 2020. **Best paper award**.
16. D. Dadush, S. Huiberts, B. Natura, L. Végh. A Scaling-Invariant Algorithm for Linear Programming whose Running Time Depends only on the Constraint Matrix. *Proceedings of the 52nd Symposium on the Theory of Computing (STOC)*, 2020.
17. D. Dadush. On Approximating the Covering Radius and Finding Dense Lattice Subspaces. *Proceedings of the 51st Annual ACM Symposium on Theory of Computing (STOC)*, 2019.
18. D. Dadush, S. Nikolov, K. Talwar, N. Tomczak-Jaegermann. Balancing Vectors in Any Norm. *Proceedings of the 59th Annual Symposium on Foundations of Computer Science (FOCS)*, 2018.
19. D. Dadush, S. Huiberts. A Friendly Smoothed Analysis of the Simplex Method. *Proceedings of the 50th ACM Symposium on Theory of Computing (STOC)*, 2018.

20. N. Bansal, D. Dadush, S. Garg, S. Lovett. The Gram-Schmidt Walk: A Cure for the Banaszczyk Blues. *Proceedings of the 50th ACM Symposium on Theory of Computing (STOC)*, 2018.

21. C. Chandrasekaran, D. Dadush, E. Grigorescu, V. Gandikota. Lattice based Locality Sensitive Hashing is Optimal. *Proceedings of the 9th Conference on Innovations in Theoretical Computer Science (ITCS)*, 2018.

22. D. Dadush, C. Guzman, N. Olver. Fast, Deterministic and Sparse Dimensionality Reduction. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2018.

23. D. Dadush, L. Végh, G. Zambelli. Geometric Rescaling Algorithms for Submodular Function Minimization. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2018.

24. N. Bansal, D. Dadush, S. Garg. An Algorithm for Komlós Conjecture Matching Banaszczyk's bound. *Proceedings of the 57th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2016.

25. D. Dadush, O. Regev. Towards Strong Reverse Minkowski-type Inequalities for Lattices. *Proceedings of the 57th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2016.

26. D. Dadush, S. Garg, S. Lovett, S. Nikolov. Towards a Constructive Version of Banaszczyk's Vector Balancing Theorem. *Proceedings of the 20th International Conference on Randomization and Computation (RANDOM)*, 2016.

27. H. Bennett, D. Dadush, N. Stephens-Davidowitz. On the Lattice Distortion Problem. *Proceedings of the 24th European Symposium of Algorithms (ESA)*, 2016.

28. D. Dadush, L. A. Végh, G. Zambelli. Rescaled coordinate descent methods for Linear Programming. *Proceedings of the 18th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2016.

29. D. Aggarwal, D. Dadush, N. Stephens-Davidowitz. Solving the Closest Vector Problem in $2^n$ Time — the Discrete Gaussian Strikes Again! *Proceedings of the 56th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2015.

30. D. Aggarwal, D. Dadush, O. Regev, N. Stephens-Davidowitz. Solving the Shortest Vector Problem in $2^n$ Time via Discrete Gaussian Sampling. *Proceedings of the 47th Symposium on Theory of Computing (STOC)*, 2015.

31. D. Dadush, N. Hähnle. On the Shadow Simplex Method for Curved Polyhedra. *Proceedings of the 31st International Symposium on Computional Geometry (SOCG)*, 2015.

32. D. Dadush. Faster Deterministic Volume Estimation in the Oracle model via Thin Lattice Coverings. *Proceedings of the 31st International Symposium on Computional Geometry (SOCG)*, 2015.

33. N. Bonifas, D. Dadush. Short Paths on the Voronoi graph and the Closest Vector Problem with Preprocessing. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2015.

34. D. Dadush, O. Regev, N. Stephens-Davidowitz. On Bounded Distance Decoding and the Closest Vector Problem with Preprocessing. *Proceedings of the Conference on Computational Complexity (CCC)*, 2014.

35. J. Briët, D. Dadush, S. Pokutta. On the existence of $0/1$ polytopes with high semidefinite extension complexity. *Proceedings of the 21st European Symposium on Algorithms (ESA)*, 2013.

36. K.M. Chung, D. Dadush, F.H. Liu, Chris Peikert. On the Lattice Smoothing Parameter Problem. *Proceedings of the Conference on Computational Complexity (CCC)*, 2013.

37. D. Dadush, D. Micciancio. Algorithms for the Densest Sublattice Problem. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2013.

38. D. Dadush, G. Kun. Lattice Sparsification and the Approximate Closest Vector Problem. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2013.

39. A. Bhaskara, D. Dadush, R. Krishnaswamy, K. Talwar. Unconditional Differentially Private Mechanisms for Linear Queries. *Proceedings of the 44th Symposium on Theory of Computing (STOC)*, 2012.

40. D. Dadush. A Randomized Sieving Algorithm for Approximate Integer Programming. *Proceedings of the 10th Latin American Theoretical INformatics Symposium (LATIN)*, 2012.

41. D. Dadush, S. Vempala. Deterministic Construction of an Approximate M-Ellipsoid and its Applications to Derandomizing Lattice Algorithms. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2012.

42. D. Dadush, C. Peikert, S. Vempala. Enumerative Lattice Algorithms in Any Norm via M-Ellipsoid Coverings. *Proceedings of the 52nd Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2011.
43. D. Dadush, S.S. Dey, J.P. Vielma. On the Chvátal-Gomory Closure of a Compact Convex Set. *Proceedings of the 15th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2011.
44. D. Dadush, C. Chandresekaran, S. Vempala. Thin Partitions: Isoperimetric Inequalities and a Sampling Algorithm for Star Shaped Bodies. *Proceedings of the ACM-SIAM Symposium for Discrete Algorithms (SODA)*, 2010.

## SUPERVISION

- **PhD:**
  - Sander Borst. 2020-Present.
  - Samarth Tiwari. 2019-Present.
  - Sophie Huiberts. 2018-2022. Graduated May 2022, Utrecht University.
  - Huck Bennett (joint with Chee Yap). Graduated August 2017, New York University.
- **Msc:**
  - Sophie Huiberts. Graduated December 2018, Utrecht University.
- **Interns:**
  - Huck Bennett. CWI Internship, Fall 2016.
  - Venkata Gandikota. CWI Internship, Fall 2016.

## HONORS & AWARDS

- Best paper award, Conference on Computational Complexity (CCC), 2020
- Vereniging voor Statistiek en Operations Research (VVSOR) Van Dantzig Award, 2020
- Mathematical Optimization Society A.W. Tucker Prize, 2015
- INFORMS Optimization Society Student Paper Prize for "On the Chvátal-Gomory Closure of a Compact Convex Set", 2011
- INFORMS Junior Faculty Interest Group (JFIG) Paper Competition Finalist, 2010 & 2011
- Elected to Phi Beta Kappa at Brown University, 2005
- David Howell Premium for Excellence in Mathematics at Brown University, 2005

## GRANTS & FELLOWSHIPS

- ERC Starting Grant: Towards a Quantitative Theory of Integer Programming, 2019-2024
- NWO Veni Grant: New Frontiers in Lattice Algorithms and Design, 2015-2018.
- Achievement Reward for College Scientists (ARCS) Fellowship, ARCS Foundation, Atlanta Chapter, 2009-2012
- Algorithms and Randomness Center (ARC) Student Fellowship, Georgia Tech, Fall 2009 & Fall 2011
- Honorable Mention, NSF Graduate Research Fellowship Program, 2008
- NSF East Asia and Pacific Summer Institutes (EAPSI) Fellowship, Summer 2008
- Georgia Tech Foundation Fellowship, 2007-2012
- ACO Graduate Student Award, Georgia Tech, 2007-2008

## SERVICE, AFFILIATIONS AND OTHER PROFESSIONAL ACTIVITIES

- Associate Editor for following journal: Mathematics of Operations Research (2023-present), Optimization Research Letters (2021-present), SIAM Journal on Discrete Mathematics (2019-present), Discrete Optimization (2015-2022).
- Program Committees: FOCS 2022, SODA 2022, ESA 2020, IPCO 2020, MIP 2019, SODA 2019, IPCO 2017, ESA 2014.

- Prize Committees: INFORMS George Nicholson Student Paper Competition 2021.
- Co-organizer of workshops:
  - Dutch Day on Optimization, October 2022.
  - Hausdorff Trimester on "Discrete Optimization", Fall 2021.
  - Annual Cargese Workshop on Combinatorial Optimization (2020-present).
  - Lattices: Geometry, Algorithms and Hardness, Simons Institute Semester on Lattices: Algorithms, Complexity, and Cryptography, Berkeley, February 2020.
  - Discrepancy Theory and Integer Programming, Centrum Wiskunde & Informatica, Amsterdam, June 2018.
- Networks & Optimization Seminar Organizer, CWI, January 2015 - Present.
- Theory Seminar Organizer, New York University, September 2012 - May 2013.
- ACO Student Seminar Organizer, Georgia Tech, January 2008 - May 2009.

## PRESENTATIONS

**Conference / Workshop / Seminar Presentations**

- *From Approximate to Exact Integer Programming*
  - CALDAM Indo-Dutch Pre-Conference School on Algorithms and Combinatorics (online), Gandhinagar, February 2023.
  - Geometry, Probability and Computing Seminar (online), Texas A&M, December 2023.
- *Interior Point Methods are Not Worse than Simplex*
  - Bocconi Theory Day, Milan, January 2022.
  - Bonn Workshop on Combinatorial Optimization, University of Bonn, October 2022.
  - Workshop on Modern Trends in Combinatorial Optimization, Bernoulli Center, EPFL, July 2022.
  - ICS Colloquium, University of Utrecht, June 2022.
- *On the Complexity of Branching Proofs*
  - MIAO Seminar, University of Copenhagen, April 2021.
  - Aussois Workshop on Combinatorial Optimization, Aussois, January 2020.
- *A Friendly Smoothed Analysis of the Simplex Method*
  - TU Munich, Munich, November 2019.
  - CORE Seminar, Louvain La Neuve, November 2018.
  - Oberwolfach workshop on Combinatorial Optimization, November 2018.
  - Reunion Workshop for the Trimester on Combinatorial Optimization, Hausdorff Institute, Bonn, August 2018.
  - Workshop on Algorithms and Randomness, Georgia Tech, Atlanta, May 2018.
- *Balancing Vectors in Any Norm*
  - University of Chile Research Seminar, Santiago, June 2019.
  - Combinatorial Optimization Workshop, Bellairs Research Institute, Barbados, April 2019.
  - Probability Seminar, Weizman Institute, Rehovot, October 2018.
  - 6th SDP Day, CWI, Amsterdam, April 2018.
- *On Approximating the Covering Radius and Finding Dense Lattice Subspaces*
  - STOC 2019, Pheonix, June 2019.
  - Dutch Mathematical Congress, Veldhoven, May 2019.
  - Aussois Workshop on Combinatorial Optimization, Aussois, January 2019.
  - KDVI Mathematics Colloquium, University of Amsterdam, October 2018.
  - ICERM Workshop on "Computational Challenges in the Theory of Lattices", Providence, April 2018.
  - Cryptography Seminar, Oxford University, Oxford, January 2018.
  - Simons Institute Workshop on Discrete Optimization via Continuous Relaxation, Berkeley, September 2017.

- *The Gram-Schmidt Walk: A Cure for the Banaszczyk Blues*, International Symposium on Mathematical Programming (ISMP), Bordeaux, July 2018.
- *Lattice based Locality Sensitive Hashing is Optimal*, Communications and Signal Processing Group Seminar, Imperial College, London, January 2018.
- *Fast, Deterministic and Sparse Dimensionality Reduction*, SODA 2018, New Orleans, January 2018.
- *Making Banaszczyk's Bound Constructive for the Komlós Problem*
  - IMA and OR Society Conference on Mathematics of Operational Research, Birmingham, April 2017.
  - Dagstuhl Seminar on Probabilistics Methods in the Design & Analysis of Algorithms, Dagstuhl, April 2017.
  - ACO 25 anniversary conference, Georgia Tech, Atlanta, January 2017.
  - Mathematics Seminar, TU Berlin, Berlin, November 2016.
  - OR Seminar, London School of Economics, London, November 2016.
  - Discrete Optimization Workshop, ETH, Zurich, August 2016.
- *Solving SVP and CVP in* $2^n$ *Time using Discrete Gaussian Sampling*, Lattice Coding and Crypto Meeting, Royal Holloway, September 2016.
- *Solving Linear Programs via Rescalable Geometry*
  - MIP 2017, Montreal, June 2017.
  - IMA and OR Society Conference on Mathematics of Operational Research, Birmingham, April 2017.
  - ICCOPT 2016, Tokyo, August 2016.
  - Relaxation workshop for Trimester in Combinatorial Optimization, Hausdorff Institute, Bonn, December 2015.
  - Cargese workshop on Combinatorial Optimization, Cargese, September 2015.
- *New Conjectures in the Geometry of Numbers*
  - Aussois workshop on Combinatorial Optimization, Aussois, January 2016.
  - Oberworfach workshop on "Convex Geometry and its Applications", Oberwolfach, December 2015.
  - Seminar for Trimester in Combinatorial Optimization, Hausdorff Institute, Bonn, November 2015.
- *Constructive Discrepancy Minimization: Vector Coloring & Equivalences*
  - AIM Workshop on Hereditary Discrepancy and Factorization Norms, San Jose, March 2016.
  - ISMP, Pittsburgh, PA, July 2015.
- *Integer Programming, Lattice Algorithms and Deterministic Volume Estimation*, Tucker Prize Talk, ISMP, Pittsburgh, PA, July 2015.
- *Solving the Closest Vector Problem in* $2^n$*-time — the Discrete Gaussian Strikes Again!*, Simons Institute Workshop on Mathematics of Cryptography, Berkeley, CA, July 2015.
- *Faster Deterministic Volume Estimation in the Oracle Model via Thin Lattice Coverings*, SOCG, TU Eindhoven, Eindhoven, June 2015.
- *Solving the Shortest Vector Problem in* $2^n$*-time via Discrete Gaussian Sampling*
  - Bochum workshop on asymmetric cryptanalysis, University of Bochum, Bochum, October 2015.
  - Optimization Seminar, TU Delft, Delft, April 2015.
- *Rescaling Positive Semidefinite Factorizations*, Dagstuhl Seminar on Extended Formulations, Dagstuhl, Germany, February 2015.
- *On the Shadow Simplex Method for Curved Polyhedra*
  - Aachen Workshop, RWTH University, Aachen, October 2015.
  - DCG-DISOPT Seminar, EPFL, Lausanne, August 2015.
  - Scientific Meeting, CWI, Amsterdam, January 2015.
  - ACO Seminar, CWI, Amsterdam, January 2015.
  - OR Seminar, London School of Economics, London, December 2014.
  - Diamant Symposium, Soest, November 2014.

- *Short Paths on the Voronoi Graph and the Closest Vector Problem with Preprocessing*
  - OR Seminar, VU University, Amsterdam, March 2015.
  - SODA, San Diego, CA, January 2015.
  - Discrete Mathematics Seminar, Bonn University, Bonn, November 2014.
  - Dutch Mathematical Congress, Delft, April 2014.
  - ACO Seminar, Georgia Tech, Atlanta, GA, March 2014.
- *Elementary Closures in Nonlinear Integer Programming*, SIAM Conference on Optimization, San Diego, CA, May 2014.
- *Near Optimal Deterministic Algorithms for Volume Computation via M-ellipsoids*, ICERM Workshop on Semidefinite Programming and Graph Algorithms, Providence, RI, February 2014.
- *On the Existence of* 0/1 *polytopes with high SDP rank*
  - CSE Seminar, University of Washington, Seattle, WA, November 2013.
  - INFORMS, Minneapolis, MN, October 2013.
  - Hierarchies Seminar, CWI, Amsterdam, September 2013.
  - ESA, Sophia Antipolis, France, September 2013.
  - Mixed Integer Programming (MIP), UW Madison, Madison, WI, July 2013.
- *On the Lattice Smoothing Parameter Problem*
  - Theory Seminar, UC San Diego, San Diego, CA, May 2013.
  - Theory Seminar, UCLA, Los Angeles, CA, May 2013.
- *Lattice Sparsification and the Approximate Closest Vector Problem*
  - Bellairs Workshop on Combinatorial Optimization, Barbados, April 2013.
  - Theory Seminar, NYU Poly, NY, March 2013.
  - SODA, New Orleans, LA, January 2013.
  - Theory Seminar, Cornell, Ithaca, NY, November 2012.
- *Integer Programming via Thin Lattice Projections*, Oberwolfach meeting on Convex Geometry and its Applications, Oberwolfach, Germany, December 2012.
- *Recent Progress on Cutting Planes and Algorithms for Convex Integer Programs*, WID-DOW Collaborative Presentation Series, University of Wisconsin - Madison, Madison, WI, March 2012.
- *Recent Progress on Integer Programming and Lattice Problems*, École Fédérale Polytechnique de Lausanne (EPFL), Lausanne, Switzerland, March 2012.
- *Convex Geometry and Lattice Problems*
  - Theory Seminar, New York University, New York, NY, February 2012.
  - Theory Seminar, IBM Research Almaden, San Jose, CA, February 2012.
- *Deterministic Construction of an Approximate M-Ellipsoid and its Applications to Lattice Algorithms*, SODA 2012, Kyoto, Japan, January 2012.
- *Convex Integer Programming*
  - International Symposium on Mathematical Programming (ISMP), Berlin, August 2012.
  - INFORMS, Charlotte, NC, November 2011.
- *Enumerative Lattice Algorithms in any Norm via M-Ellipsoid Coverings*
  - Algebra and Discrete Mathematics Seminar, UC Davis, Davis, CA, October 2011.
  - FOCS, Palm Springs, CA, October 2011.
  - China Theory Week, Aarhus University, Aarhus, Denmark, October 2011.
  - IP For Lunch, IBM, Yorktown, NY, July 2011.
  - CS Theory Seminar, University of California, San Diego, CA, April 2011.
  - Lattice Days, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, February 2011.
- *On The Chvátal-Gomory Closure of a Compact Convex Set*
  - Junior Faculty Interest Group Paper Competition, INFORMS Annual Meeting, Charlotte, NC, November 2011.
  - Optimization Society Student Paper Prize Talk, INFORMS Annual Meeting, Charlotte, NC, November 2011.
  - Integer Programming and Combinatorial Optimization (IPCO), Armonk, NY, June 2011.

- INFORMS, Austin, TX, October 2010.

- *Thin Partitions: Isoperimetric Inequalities and a Sampling Algorithm for Star Shaped Bodies*, SODA, Austin, TX, January 2010.
- *An Elementary Technique to Prove some Basic Inequalities in Convex Geometry*, AMS Sectional Meeting, San Francisco, CA, April 2009.

**Lecture Series**

- Cargese Workshop on Combinatorial Optimization, Cargese, France, October 2016.
  - Lecture 1: Integer Programming and the Flatness Theorem.
  - Lecture 2: Banaszczyk's Proof of the Flantness Theorem.
  - Lecture 3: Lattice Point Enumeration in Convex Bodies.
- École de Printemps Informatique Théorique (EPIT), Autrans, France, March 2013.
  - Lecture 1: Transference Theorems in the Geometry of Numbers.
  - Lecture 2: Integer Programming and General Norm Lattice Problems.

**Additional Presentations**

- *On the Integer Width of Lattice Free Sets*, ACO Student Seminar, Atlanta, GA, February 2012.
- *Approximate Integer Programming*, Theory Reading Group, Georgia Tech, Atlanta, GA, November 2011.
- *Open Problems in Lattice Algorithms and Theory*, Student Discrete Math Seminar, UC Davis, Davis, CA, October 2011.
- *New Interactions between Asymptotic Convex Geometry and Lattice Theory*, Linear Analysis Seminar, Texas A&M, College Station, TX, September 2011
- *Vector Sum Rearrangement and its Applications*, Final Presentation, IBM Research Watson, Yorktown, NY, August 2011.
- *An Introduction to the Shortest and Closest Vector Problem*, CS Theory Reading Group, Georgia Tech, Atlanta, GA, October 2010.
- *On the Chvátal Closure on a Strictly Convex Body*, ISyE DOS Optimization Seminar, Georgia Tech, Atlanta, GA, February 2010.
- *Towards the KLS Conjecture for Convex Bodies*, ARC Theory Lunch, Georgia Tech, Atlanta, GA, September 2009.
- *Rapidly Mixing Random Walks on Convex Bodies*, Convex Geometry Student Seminar, Tel Aviv University, Tel Aviv, Israel, July 2009.
- *A Friendly Introduction to Constraint Programming*, ACO Student Seminar, Georgia Tech, Atlanta, GA, October 2008.
- *A Proof of the Road Coloring Conjecture*, ACO Student Seminar, Georgia Tech, Atlanta, GA, April 2008.
- *Uncrossing in Combinatorial Optimization*, ISyE DOS Optimization Seminar, Georgia Tech, Atlanta, GA, November 2007.

## Teaching Experience

**Utrecht University**, Amsterdam, Netherlands
*Instructor*, LNMB and Mastermath *September 2022 – December 2022, September 2019 – December 2019*
Taught the LNMB (Dutch OR network) course "Continuous Optimization" within Mastermath.

**Utrecht University**, Amsterdam, Netherlands
*Instructor*, Mastermath *February 2019 – June 2019*
Co-taught and co-developed with Jop Briet (CWI) the course "Geometric Functional Analysis and its Applications". (Course Website).

**Utrecht University**, Amsterdam, Netherlands
*Instructor*, Mastermath *February 2018 – June 2018*
Co-taught and co-developed with Leo Ducas (CWI) the course "Introduction to Lattice Algorithms and Cryptography". (Course Website).

**Vrije University**, Amsterdam, Netherlands
*Instructor*, Mastermath *February 2017 – June 2017*

Co-taught and co-developed with Nikhil Bansal (Eindhoven) the course "Advanced Topics in Semidefinite Programming". (Course Website).

**Amsterdam University College**, Amsterdam, Netherlands
*Instructor*, Mathematics Department *Fall 2016 & Fall 2017*
Co-taught undergraduate discrete math course "Discrete Mathematics & Algebra".

**Utrecht University**, Utrecht, Netherlands
*Instructor*, Mastermath *February 2016 – June 2016*
Co-taught and co-developed with Bodo Manthey (Twente) the course "Algorithms Beyond the Worst Case" on the subject of smoothed analysis. (Course Website).

**New York University**, New York NY, USA
*Instructor*, Department of Computer Science *January 2013 – May 2013*
Developed and taught an advanced graduate level seminar on the geometry of lattices and the complexity of lattice problems.

**Spring School on Lattices**, Autrans, France
*Lecturer*, L'École de Printemps d'Informatique Théorique *March 2013*
Invited to give 3 hours of lectures at a Spring School on Theoretical Computer Science on "Lattices and Convex Geometry" (School Website).

**New York University**, New York NY, USA
*Recitation Instructor*, Department of Computer Science *September 2012 – December 2012*
Recitation instructor for around 80 students in a Masters level Algorithms course.

**Boston University**, Boston MA, USA
*Counselor*, Program in Mathematics for Young Scientists (PROMYS) *July 2003 – August 2003*

- Responsible for counseling PROMYS students with their daily number theory homework sets and leading select review sessions.

## Work Experience

**ITA Software**, Cambridge MA, USA
*Intern Software Developer* *June 2006 – December 2006*

- Developed software for ITA's Needle group. The Needle project was a web based data collection, aggregation and publishing tool.

**YODA SpA**, Milan, Italy
*Software Developer* *August 2000 – December 2001*

- Worked as a web programmer developing both front-ends and back-ends for large web projects.

## Skills

**Languages:** Fluent in English, French and Italian