

VITAE

Jesús Antonio De Loera

PERSONAL INFORMATION

Birthdate: January 18, 1966

Married, two children (now adults)

Citizenship: USA and México

Languages: Fluent in Spanish (native), French, and English.

Intermediate knowledge of German,

Beginners knowledge of Italian and Portuguese.

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EDUCATION

Ph.D. Cornell University, Applied Mathematics, April 1995.

M.S. Cornell University, Applied Mathematics (Operations Research), February 1993.

M.A. Western Michigan University, Mathematics, May 1990.

B.S. National University of Mexico, Mathematics, May 1989.
(Honors thesis: “*On the genus of finite groups*”)

Doctoral Dissertation

Title: “*Triangulations of Polytopes and Computational Algebra.*”

Advisor: Professor Bernd Sturmfels (UC Berkeley/MPI Leipzig).

RESEARCH TOPICS

Combinatorics, Discrete Mathematics.

Algorithms and Computation in Algebra, Combinatorics, Geometry, & Optimization.

Convex and Discrete Geometry, Geometry of Numbers.

Algebraic, Geometric, and Topological methods in Applied Mathematics.

Optimization, Operations Research, Data Science, Statistics, and many Other applications.

PROFESSIONAL EXPERIENCE

2005-to date: Professor of Mathematics and member of the Graduate groups in Applied Mathematics and Computer Science, University of California, Davis.

2019- 2022: Chair of the Graduate group in Applied Mathematics University of California, Davis.

2014-2015: Professor and Faculty Assistant to the Dean of Math. and Physical Sciences for Undergraduate Affairs, UC Davis (equivalent to associate dean position).

2012-2014: Professor and Vice-Chair of Undergraduate Affairs for the Mathematics Department, UC Davis.

2002-2005: Associate Professor, Dept. of Mathematics, University of California, Davis.

1998-2001: Assistant Professor, Dept. of Mathematics, University of California, Davis.

1998-1999: Visiting researcher, Dept. of Computer Science, Swiss Federal Institute of Technology Zürich (ETH-Zürich).

1995-1998: Visiting Assistant Professor of Mathematics, University of Minnesota.

1991-1994: Teaching and Research assistant, Cornell University.

1987-1988: Teaching and Research assistant, National University of Mexico.

Memberships to scientific societies: AMS, SIAM, MAA, and INFORMS

Visiting Positions: visiting researcher at the following research institutions:

- Hausdorff Institut für Mathematik, Universität Bonn (2 months).
- Centre d' Enseignement et de Recherche en Mathématiques et Calcul Scientifique CERMICS (3 months)
- Institute for Mathematics and its Applications, Univ. of Minnesota (3 months)
- Newton Institute for Mathematical Sciences, Cambridge University, UK. (2 months)
- Technische Universität München, Germany (one semester)
- Institute for Pure and Applied Mathematics, UCLA (one semester)
- Universität Magdeburg, Germany (sabbatical year)
- Swiss Federal Institute ETH-Zürich, Switzerland.
- Mathematical Science Research Institute, Berkeley USA (two semesters, 2003 & 2017)
- Universidad de Cantabria, Spain (1 month).
- CINVESTAV-Instituto Politécnico Nacional, Mexico (two visits of one month, 2000 & 2022).

ACADEMIC HONORS

Scientific Awards

- 2020 winner of the INFORMS Optimization Society Farkas Prize.
- 2019 Fellow of the Society of Industrial and Applied Mathematics.
- 2014 Fellow of the American Mathematical Society.
- 2014 Bernard Society Lecture, Davidson College.
- 2013 Kemeny Lectures award, Dartmouth College.
- 2012 John von Neumann award, Technical University of Munich, Germany.
- 2011 Alumni Achievement Award, Western Michigan Univ.
- 2010 co-winner of the INFORMS computer society prize.
- 2004 Alexander Von Humboldt Award.
- 2003-2008 UC Davis, Chancellor's fellow Award.
- 1995-1998 Postdoctoral fellow at the Geometry Center of the University of Minnesota.
- 1989-1995 National University of Mexico (UNAM) doctoral Fellowship
- 1986-1988 National University of Mexico (UNAM) Undergraduate Fellowship.

Teaching, Mentoring, and Service Awards

- 2020 ADVANCE Scholar Award, UC Davis Office for Diversity, Equity and Inclusion.
- 2018 Distinguished Teaching Award, College of Letters and Science UC Davis.
- 2017 Golden Section Teaching award of the Mathematical Association of America.
- 2013 UC Davis Chancellor's Award in undergraduate research mentoring.
- 2007 Award for excellence in service to graduate students, UC Davis Graduate Student Association.
- 2006 UC Davis, Principles of community and Diversity Award.
- 2001 Galois Group Award to individuals who serve the mathematics graduate program in a unique way.

RESEARCH ACTIVITIES

ALL SCHOLARLY PUBLICATIONS

Books

- (1) (with F. Santos and J. Rambau) "Triangulations: Structure for Algorithms and Applications", No. 25 of the series "Algorithms and Computation in Mathematics" Springer Verlag, 2010, 545 pages.
- (2) (with R. Hemmecke and M. Köppe) Algebraic and Geometric ideas in Discrete Optimization, volume 14 in SIAM-MOS series on Optimization books. SIAM 2013, ISBN 978-1-61197-243-6, pp. I-XIX, 322 pages.

Refereed Articles (Published or to Appear only)

- (1) (with B. Sturmfels, and R. R. Thomas), "Gröbner bases and triangulations of the second hypersimplex", *Combinatorica*. 15, (3), 1995, 409-424.
- (2) "Gröbner bases and graph colorings", *Beiträge zur Algebra und Geometrie*. 36, (1), 1995, 89-96.
- (3) "Non-regular triangulations of product of simplices", *Discrete and Computational Geometry*. 15, 1996, 253-264.
- (4) (with F. Santos), "An effective version of Pólya's theorem on positive definite forms", *Journal of Pure and Applied Algebra.*, 108, 1996, 231-240.
- (5) (with S. Hoşten F. Santos and B. Sturmfels), "The polytope of all triangulations of a point configuration", *Documenta Mathematica J. DMV.*, 1, 1996, 103-119.
- (6) (With F. Wicklin) "On the need of convexity in Patchworking", *Advances in Applied Mathematics* 20, 1998, 188-219.
- (7) (with F. Santos and J. Urrutia), "The number of geometric bistellar flips of a triangulation", *Discrete and Computational Geometry*, 21, No.1, 1999, 131-142.
- (8) (with W. Morris), "Q-matrix recognition via secondary and universal polytopes", *Mathematical Programming*, 85, 259-276 (1999).
- (9) (with C. Athanasiadis, V. Reiner and F. Santos), "Fiber Polytopes for the projections of cyclic polytopes.", *European Journal of Combinatorics* 21, No. 1, 2000, 19-47.
- (10) (with A. Below and J. Richter-Gebert) "Finding minimal triangulations of convex 3-polytopes is NP-hard", Research Announcement in *Proc. of the eleventh Symposium of Discrete Algorithms* San Francisco, 2000, 65-66.
- (11) (with F. Wicklin), "Viro's patchworking disproves Ragsdale's conjecture", **Videotape** (10 minutes) and short expository article *Proceedings of the sixteenth annual ACM-SIAM Symposium on Computational Geometry*, Hong Kong, 2000, 371-372.

- (12) (with A. Below, U. Brehm and J. Richter-Gebert), “Minimal simplicial dissections and triangulations of convex 3-polytopes”, *Discrete and Computational Geometry* 24, 2000, 35-48.
- (13) (with F. Santos and F. Takeuchi) “Extremal properties of optimal dissections of convex polytopes” *SIAM Journal of Discrete Mathematics* 14, No.2, 2001, 143-161.
- (14) (with A. Below and J. Richter-Gebert), “The complexity of finding small triangulations of convex 3-polytopes”, *J. Algorithms* 50(2): 134-167 (2004)
- (15) (with B. Sturmfels) “Algebraic Unimodular Counting” in *Mathematical Programming B*. Special issue in “Algebraic and Topological Techniques in Discrete Optimization” *Math. Program.* 96(2): 183-203 (2003).
- (16) (with E. Peterson and F. Su) “A Polytopal Generalization of Sperner’s lemma” *Journal of Combinatorial Theory (A)*, 100: 1–26, (2002)
- (17) (with M. Ahmed and R. Hemmecke) “Polyhedral Cones for Magic Cubes and Squares” in “New directions in Combinatorial Geometry: The Goodman-Pollack Festschrift volume” (edited by Aronov et al), Springer, 2003, 25–41.
- (18) (with S. Onn), “The complexity of 3-way statistical tables”, *SIAM J. of Computing.* 33, No. 4, 819–836, 2004.
- (19) (with D. Haws, R. Hemmecke, P. Huggins, B. Sturmfels, R. Yoshida) ”Short rational functions for toric algebra and its applications” *Journal of Symbolic Computation*, 38, 2004, 959–973.
- (20) (with D. Haws, R. Hemmecke, P. Huggins, R. Yoshida) ”Three kinds of Integer Programming Algorithms based on Barvinok’s rational functions” in proceedings *Tenth International Conference in Integer Programming and Combinatorial Optimization, New York NY, June 2004* Lecture Notes in Computer Science, Vol 3064, 244–255.
- (21) (with S. Onn) “All rational polytopes are transportation polytopes and all polytopal integer sets are contingency tables” in proceedings *Tenth International Conference in Integer Programming and Combinatorial Optimization, New York NY, June 2004* Lecture Notes in Computer Science, Vol 3064, 338–351.
- (22) (with W. Baldoni-Silva and M. Vergne) ”Counting integer flows in networks” *Foundations of Computational Mathematics*, vol. 4, 2004, 277–314.
- (23) (with R. Hemmecke, J. Tauzer, and R. Yoshida) “Effective lattice point counting in rational convex polytopes.” *Journal of Symbolic Computation*, vol. 38 no. 4 (2004), 1273–1302.
- (24) (with T. McAllister) ”Vertices of Gelfand-Tsetlin polytopes” *Discrete and Computational Geometry*, vol 32, No. 4, (2004), 459–470.
- (25) (with M. Beck, M. Develin, J. Pfeifle, R.P. Stanley) ”Coefficients and zeroes of Ehrhart polynomials”. in *Integer points in polyhedrageometry, number theory, algebra, optimization*, Contemp. Math. 374, Providence, RI: Amer. Math. Soc., pp. 1536, MR 2134759.

- (26) (with S. Onn) "Markov bases of 3-way tables are arbitrarily complicated" *Journal of Symbolic computation* 41:173–181, 2006.
- (27) (with L. Bowen, M. Develin and F. Santos) "The Gromov norm of the product of two surfaces" *Topology*, 44, (2005), 321–339.
- (28) "The many aspects of counting lattice points in polyhedra" *Mathematische Semesterberichte* (2005) 52: 175–195.
- (29) (with R. Hemmecke, M. Köppe, and R. Weismantel) "Integer polynomial optimization in fixed dimension." *Mathematics of Operations Research*. (2006), vol 31, No.1, 147–153.
- (30) (with R. Hemmecke, D.Haws, P. Huggins, R. Yoshida) "Computational Study of integer programming algorithms based on Barvinok's rational functions" *Discrete Optimization*. 2, (2005) 135–144.
- (31) (with T. McAllister) "On the Computation of Clebsch-Gordan coefficients and the dilation effect" *Experimental Mathematics*, vol 15. No. 1, (2006), 7–19.
- (32) (with R. Hemmecke, M. Köppe, R. Weismantel) "FPTAS for optimizing polynomials over the mixed-integer points of polytopes in fixed dimension." *Mathematical Programming*, 115, No. 2, (2008) 273–290. Earlier version appeared in the proceedings of *2006 ACM-SIAM Symposium on Discrete Algorithms, Miami Florida*, 743-748.
- (33) (with S.Onn) "All linear and integer programming problems are slim 3-way transportation programs", *SIAM J. of Optimization.*, vol 17, No. 3, (2006), 806–821.
- (34) (with R. Hemmecke, S. Onn, and R. Weismantel) "N-fold integer programming" *Discrete Optimization*, 5:231–241, 2008
- (35) (with R. Hemmecke, U.Rothblum, S. Onn, and R. Weismantel) "Integer convex maximization" *Journal of Pure and Applied Algebra*, 213:1569–1577, 2009.
- (36) (with E. Kim, F. Santos, and S. Onn) "Graphs of transportation polytopes" *Journal of Combinatorial Theory A*. 116 (2009), 1306-1325
- (37) (with S. Margulies, J. Lee, and S. Onn) "Expressing Combinatorial problems via systems of Polynomials equations and Hilbert's Nullstellensatz" *Combinatorics, Probability, and Computing*, volume 18, issue 04, pp. 551-582, 2009.
- (38) (with F. Liu and R. Yoshida) "A generating function for all semi-magic squares and the volume of the Birkhoff polytope" *Journal of Algebraic Combinatorics*. 30 (2009), no. 1, 113-139.
- (39) (with R. Hemmecke and M. Köppe) "Pareto optima of multicriteria integer programs" *INFORMS journal of Computing*. Vol. 21, No. 1, (2009), 39–48.
- (40) (with D. Haws and M. Köppe) "Ehrhart polynomials of Matroid polytopes and polymatroids" *Discrete and Computational Geometry*. 2009, available online DOI 10.1007/s00454-008-9080-z

- (41) (with J. Lee, P. Malkin and S. Margulies) “Hilbert’s Nullstellensatz and an Algorithm for Proving Combinatorial Infeasibility” *Proceedings of the twenty-first international symposium on Symbolic and algebraic computation, ISSAC 08*, 2008, 197–206, Linz/Hagenberg, Austria, Published by ACM, New York, NY, USA.
- (42) (with P. Malkin and P. Parrilo) Computation with Polynomial Equations and Inequalities arising in Combinatorial Optimization, in “Mixed Integer Non-Linear Programming” (J. Lee and S. Leyffer eds.), IMA Volumes in Mathematics and its Applications, Vol. 154. 1st Edition., 2011, X, 660 p.
- (43) (with V. Baldoni, N. Berline, M. Köppe, M. Vergne), How to integrate a polynomial over a simplex, *Mathematics of Computation*, vol. 80, 273, 297–325, 2011.
- (44) (with D. Haws, J. Lee and A. O’Hair), Computation in Multicriteria Matroid Optimization, *ACM Journal of Experimental Algorithmics*, volume 14, pages 8:1.8–8:1.33, 2010.
- (45) Counting and Estimating Lattice Points: Tools from Algebra, Analysis, Convexity and Probability, *Optima*, newsletter of the Mathematical Programming Society, 81, 1-9, 2009. available at <http://www.mathprog.org/Optima-Issues/optima81.pdf>
- (46) (with C. Hillar, P. Malkin and M. Omar) “Recognizing Graph Theoretic Properties with Polynomial Ideals”, *Electronic Journal of Combinatorics*, Vol 17, R114 (2010).
- (47) (with J. Lee, P. Malkin and S. Margulies) “Computing Infeasibility Certificates for Combinatorial Problems through Hilbert’s Nullstellensatz”, *Journal of Symbolic Computation*, Volume 46, Issue 11, November 2011, Pages 1260-1283 (a shorter conference version appeared in 2008 as article [41]).
- (48) “New Insights into the Complexity and Geometry of Linear Optimization”, in *Optima*, newsletter of the Mathematical Optimization Society. 87, 1-13, 2011. available at <http://www.mathprog.org/Optima-Issues/optima87.pdf>
- (49) (with V. Baldoni, N. Berline, M. Köppe, and M. Vergne), “Computation of the highest coefficients of weighted Ehrhart quasi-polynomials of rational polyhedra”, *Foundations of Computational Mathematics*, 12(4): 435-469 (2012)
- (50) (with B. Sturmfels and C. Vinzant), “The central curve of linear programming”, *Foundations of Computational Mathematics*, 12 (2012) 509-540.
- (51) (with Y. Kemper, S. Klee) “ h -vectors of small matroid complexes”, *Electronic Journal of Combinatorics*, 19 (2012), No. 1, 11 pages.
- (52) (with B. Dutra, M. Koepppe, S. Moreinis, G. Pinto, J. Wu) “Software for Exact Integration of Polynomials over Polyhedra”, *Computational Geometry Theory and Applications* 46(3): 232-252 (2013).
- (53) (with S. Klee) “Transportation Problems and Simplicial Polytopes That Are Not Weakly Vertex-Decomposable”, *Mathematics of Operations Research*, Vol 37, No. 34, (2012), 670–674.

- (54) (with R. Hemmecke, M. Köppe) “Foundations of Discrete Optimization: in transition from linear to non-linear models and methods” *Jahresbericht Deutsche Mathematiker Vereinigung*, (2012), 114: 189–207.
- (55) (with K. Burggraff and M. Omar), “On volumes of permutation polytopes”, in “Discrete Geometry and Optimization”, Vol 69 of *Fields Institute Communications*, eds. (A. Deza, K. Bezdek, Y. Ye), (2013), 55–78.
- (56) (with V. Baldoni, N. Berline, B. Dutra, M Köppe, M. Vergne) “Top coefficients of the Denumerant” in the *Proceedings of FPSAC 2013, Paris June 2013*.
- (57) (with A. Basu, M. Junod) “On Chubanov’s method for Linear Programming”, *INFORMS Journal on Computing*, 26, No. 2, (2014), 336–350.
- (58) “Comments on: Recent progress on the combinatorial diameter of polytopes and simplicial complexes”, *TOP*, Official Journal of the Spanish Society of Statistics and Operations Research.
- (59) (with Y. Kemper) ”Polyhedral Embeddings of Cayley Graphs,” *Electronic Notes in Discrete Mathematics*, 43: 279-288. 2014.
- (60) (with E. Kim) “Combinatorics and Geometry of Transportation polytopes: An Update”. *Contemporary Mathematics*, AMS, vol. 625, *Proceedings AMS special session “Discrete Geometry and Algebraic Combinatorics”* (Barg et al. editors), (2014), 37–76.
- (61) (with I. Aliev and Q. Louveaux) “Integer programs with prescribed number of solutions and a weighted version of Doignon-Bell-Scarf theorem” in the *Proceedings of the The 17th Conference on Integer Programming and Combinatorial Optimization June 23 - 25, 2014, Bonn - Germany*.
- (62) (with J. Lee, J. Miller, S. Margulies) “Weak Orientability of Matroids and Polynomial Equations”, *European Journal of Combinatorics*, 50, (2015), 56–71.
- (63) (with V. Baldoni, N. Berline, B. Dutra, M. Köppe, M. Vergne) “Coefficients of Sylvester’s Denumerant” in *INTEGERS*, vol. 15, (2015), A11 (32 pages), available at <http://www.integers-ejcnt.org/vol15.html>.
- (64) (with I. Aliev, R. Bassett, and Q. Louveaux) ”A Quantitative Doignon-Bell-Scarf Theorem” in *Combinatorica*, *Combinatorica* 37(3): 313-332 (2017).
- (65) (with S. Margulies, M. Pernpeintner, E. Riedl, D. Rolnick, G. Spencer, D. Stasi, J. Swenson), Graph-coloring ideals: Nullstellensatz certificates, Gröbner bases for chordal graphs, and hardness of Gröbner bases. In *Proceedings of the 2015 ACM International Symposium on Symbolic and Algebraic Computation, ISSAC 2015, Univ. of Bath, Bath UK, ACM New York, NY, USA, 133–140*.
- (66) (with I. Aliev and Q. Louveaux), Parametric Polyhedra with at least k Lattice Points: Their Semigroup Structure and the k -Frobenius Problem. In *Recent Trends in Combinatorics*, (eds. Beveridge et al), *IMA Volumes in Mathematics and its Applications*, a Springer Series, vol. 159, (2016), 753–778.

- (67) (with R. Hemmecke and J. Lee), On Augmentation Algorithms for Linear and Integer-Linear Programming: From Edmonds-Karp to Bland and Beyond. *SIAM J. of Optimization*, 25, No. 4, (2015) 2494–2511.
- (68) (with S. Petrovic and D. Stasi), Random Sampling in Computational Algebraic Geometry: Helly numbers and violator spaces *Journal of Symbolic Computation*, *J. Symb. Comput.* 77, (2016), 1–15.
- (70) (with R. La Haye, A. Montejano, D. Oliveros, E. Roldán-Pensado), A Rainbow Ramsey Analogue of Rado’s Theorem, *Discrete Mathematics*. Vol. 339, 11, (2016), 2812–2818.
- (69) (with S. Borgwardt, J. Miller, and E. Finhold), The Hierarchy of Circuit Diameters and Transportation Polytopes, *Discrete Applied Mathematics*, Vol. 240, (2018), 8–24. Available online at <https://doi.org/10.1016/j.dam.2015.10.017>
- (71) (with V. Baldoni, N. Berline, M. Köppe, M. Vergne), Intermediate Sums on Polyhedra II: Bidegree and Poisson Formula. *Mathematika*, Vol. 62, (3) 2016 , 653–684, available online <https://doi.org/10.1112/S0025579315000418>
- (72) (with N. Amenta and P. Soberón) Helly’s Theorem: New Variations and Applications, in *Algebraic and geometric methods in discrete mathematics*, edited by H. Harrington et al, *Contemp. Math.*, vol. 685, Amer. Math. Soc., Providence, RI, 2017, pp. 55–95. Available online at <https://doi.org/10.1090/conm/685/13718>
- (73) (with R. La Haye, D. Oliveros, E. Roldán-Pensado) Helly numbers of Algebraic subsets of \mathbf{R}^n and an extension of Doignon’s theorem, *Advances in Geometry*. Vol. 17 (4), (2017) 473–482. Available online <https://doi.org/10.1515/advgeom-2017-0028>
- (74) (with S. Borgwardt and E. Finhold), *Edges vs Circuits: A Hierarchy of diameters in polyhedra*. *Advances in Geometry*; 16 (4) (2016): 511–530. <https://doi.org/10.1515/advgeom-2016-0020>.
- (75) (with J. Haddock and D. Needell), *A Sampling Kaczmarz-Motzkin Algorithm for Linear Feasibility*. *SIAM Scientific Computing*, Vol. 39 (5), (2017) S66–S87. Available online <https://doi.org/10.1137/16M1073807>
- (76) (with R. N. La Haye, D. Rolnick, P. Soberón), *Quantitative Tverberg theorems over lattices and other discrete sets*. *Discrete and Computational Geometry*, Vol. 58 (2017), no. 2, 435–448. Available online <https://doi.org/10.1007/s00454-016-9858-3>
- (77) (with R. N. La Haye, D. Rolnick, P. Soberón), *Quantitative combinatorial geometry for continuous parameters*. *Discrete and Computational Geometry*, Vol. 57 (2017), no. 2, 318–334. Available online <https://doi.org/10.1007/s00454-016-9857-4>
- (78) (with I. Aliev, C. O’Neill, and T. Oertel) *Sparse solutions of linear Diophantine equations*. *SIAM journal of Applied Algebra and Geometry*, 1(1), (2017) 239–253. Available online <https://doi.org/10.1137/16M1083876>
- (79) (with R. La Haye, D. Oliveros, E. Roldán-Pensado) *Beyond Chance-Constrained Convex Mixed-Integer Optimization: A Generalized Calafiore-Campi Algorithm and the notion of S-optimization*. *Journal of Convex Analysis* 25 (2018), No. 1, 201–218

- (80) (with S. Borgwardt and E. Finhold), *The Hirsch conjecture holds true for all network-flow polytopes* Mathematical Programming (2017). online <https://doi.org/10.1007/s10107-017-1176-x>
- (81) (with J. Haddock and L. Rademacher), *The Minimum Euclidean-Norm Point on a Convex Polytope: Wolfe's Combinatorial Algorithm is Exponential*. STOC 2018 Proceedings of the 50th Annual ACM SIGACT Symposium on Theory of Computing, Los Angeles. (2018), 545–553. Available online <https://doi.org/10.1145/3188745.3188820>
- (82) (with T. Hogan, F. Meunier, N. Mustafa), *Integer and Mixed Integer Tverberg Numbers in Low Dimension* in Proceeding of the 34th European Workshop in Computational Geometry, Berlin (2018), Paper #36:1-6, Available online at https://conference.imp.fu-berlin.de/eurocg18/download/eurocg_proc.pdf
- (83) (with I. Aliev, F. Eisenbrand, T. Oertel, and R. Weismantel), *All Integer linear programs have sparse optimal solutions*. to appear in *SIAM Journal of Optimization*. 28 (3): 2152-2157 (2018)
- (84) (with S. Petrovic, L. Silverstein, D. Stasi, and D. Wilburne), *Random Monomial Ideals* *Journal of Algebra*. Volume 519, 1, (2019),440–473.
- (85) (with L. Silverstein, S. Hosten, R. Krone), *Average behavior of Minimal Free Resolutions of Monomial Ideals*. *Proceedings of the American Math. Soc.* Volume 147, 8, (2019), 3239–3257.
- (86) (with X. Goaoc, F. Meunier, and N. Mustafa), *The discrete yet ubiquitous theorems of Carathéodory, Helly, Sperner, Tucker, & Tverberg*. *Bulletin of the American Mathematical Society*. Volume 56, Number 3, (2019), Pages 415–511.
- (87) (with V. Baldoni, N. Berline, M. Köppe, M. Vergne), *Three Ehrhart Quasi-polynomials*. *Algebraic Combinatorics*. Volume 2, issue 3 (2019), pages 379–416.
- (88) (with C. O'Neill, D. Wilburne) *Random numerical semigroups and a simplicial complex of irreducible semigroups*. *Electronic Journal of Combinatorics*. Vol. 25 (4): Issue 4 (2018). Available online <https://doi.org/10.37236/7796>
- (89) *Algebraic and Topological Tools in Linear Optimization* Notices of the American Mathematical Society Number 66 (07), (2020), Pages 1023–1033.
- (90) (with J. Haddock, A. Ma, D. Needell) *Data-driven Algorithm Selection and Tuning in Optimization and Signal Processing* Annals of Mathematics and Artificial Intelligence. Volume 89, pages 711–735 (2021). Available online at <https://doi.org/10.1007/s10472-020-09717-z>
- (91) (with J. Haddock and L. Rademacher) *The Minimum Euclidean-Norm Point on a Convex Polytope: Wolfe's Combinatorial Algorithm is Exponential*. *SIAM Journal of Computing*. Vol. 49, No. 1, pp. 138–169, (2020)
- (92) (with G. Averkov, A. Aliev, T. Oertel) *Optimizing Sparsity over Lattices and Semigroups*, In: Bienstock, D., Zambelli, G. (eds) *Proceedings of Integer Programming and*

Combinatorial Optimization. IPCO 2020. Lecture Notes in Computer Science, vol 12125. Springer, Cham. pages 41–51 https://doi.org/10.1007/978-3-030-45771-6_4

(93) (with T. Hogan) *Stochastic Tverberg Theorems with Applications to Multiclass Logistic Regression, Separability, and Centerpoints of Data*. SIAM Journal of Data Science, Vol. 2(4): pages 1151–1166 (2020).

(94) (with T. Hogan, D. Oliveros, D. Yang) *A Tverberg Theorem with Trees and Cycles as (Nerve) Intersection Patterns*. Discrete and Computational Geometry. vol. 65, pages 916–937 (2021)

(95) (with G. Averkov, A. Chavez, B. Gillespie) *The Lattice of Cycles of an Undirected Graph*. Linear Algebra and its Applications, Volume 611, 15 February 2021, Pages 213–236. <https://doi.org/10.1016/j.laa.2020.10.027>

(96) (with G. Averkov, A. Aliev, T. Oertel) *Sparse representations of vectors in Lattices and Semigroups*. Mathematical Programming. Vol 192 (1): 519–546 (2022)

(97) (with C. Athanasiadis and Z. Zhang) *Extremal Enumerative Problems on Monotone Paths and Arborescences*, Journal of Graph Theory, Volume 99 (1) (2022), pages 58–81

(98) (with M. Blanchard and Q. Louveaux) *On Lengths of monotone paths of polyhedra*. SIAM Journal of Discrete Mathematics. Vol 35 (3): pages 1746–1768 (2021)

(99) (with I. Adler, S. Klee, Z. Zhang) *Diameters of Cocircuit Graphs of Oriented Matroids*. Electronic Journal of Combinatorics. Electron. J. Comb. 28(4) (2021). Online available at <https://doi.org/10.37236/9653>

(100) (with Y. Chang and W. J. Wesley) *Rado Numbers and SAT Computations*. Proceedings of the 47th International Symposium on Symbolic and Algebraic Computation (ISSAC 2022). Pages 333–342, available online at <https://doi.org/10.1145/3476446.3535494>

(101) (with E. Jaramillo-Rodriguez, D. Oliveros, A. Torres-Hernandez) *A Model for Bird-watching and other Chronological Sampling Activities*. to appear in the *American Mathematical Monthly*.

(102) (with S. Kafer and L. Sanità) *Pivoting rules for Circuit Augmentation Algorithms in Linear optimization*. to appear in *SIAM journal of Optimization*.

(103) (with Y. Wu) *Geometric Policy Iteration for Markov Decision Processes* to appear in the Proceedings of ACM SIGKDD 2022 Conference on Knowledge Discovery and Data Mining

Finished work submitted for publication (preprints available on math ArXiv)

(104) (with A. E. Black) *Monotone Paths of Cross-Polytopes*, submitted to *Discrete and Computational Geometry*.

(105) (with A. E. Black, S. Kafer, L. Sanità) *On the Simplex method for 0/1 polytopes* submitted to *Mathematics of Operations Research*

(106) (with A. E. Black, N. Lütjeharms, and R. Sanyal) *The Polyhedral Geometry of Pivot Rules and Monotone Paths* submitted to *SIAM Applied Algebra and Geometry*

SOFTWARE

The original *LattE* was first developed in 2001 as C++ software to study lattice points of convex polytopes, primarily counting them and computation of Ehrhart functions (see paper (23)). The algorithms used combinations of geometric and symbolic computation. The key data structures are rational generating functions and cone decompositions. It was the first ever implementation of Barvinok's algorithm. The latest *Latte Integrale 1.7.2* incorporates the ability to integrate a polynomial over a polytope.

V. Baldoni, N. Berline, J.A. De Loera, B. Dutra, M. Köppe, S. Moreinis, G. Pinto, M. Vergne, J. Wu, A User's Guide for LattE integrale v1.7.2, 2013. All versions of the software package LattE are available at <http://www.math.ucdavis.edu/latte/>

SELECTED TALKS AND LECTURES:

- *Plenary Speaker or Keynote Lecturer for large national or international events:*
 - Plenary speaker SIAM annual Meeting, July 2021 (online)
 - Plenary speaker National Mathematics Festival, April 2021 (online)
 - Plenary speaker, Bay Area Discrete Math Day, November 2020 (online).
 - Plenary speaker AMS invited address Joint Mathematical Meetings, Baltimore, January 2019.
 - Plenary speaker “30th RAMP (Operations Research Soc. of Japan) Symposium”, Hiroshima, Japan, October 2018.
 - Plenary speaker 2018 FPSAC (Formal Power Series and Algebraic Combinatorics) Dartmouth College. July 2018.
 - Plenary speaker “Latinx in the Mathematical Sciences”, IPAM Conference, March, 2018.
 - Plenary speaker 2018 MAA Golden Section meeting, Cal State East Bay, February 2018.
 - Plenary speaker 2017 MOPTA (Modeling and Optimization: Theory and Applications) Lehigh University, August 2017
 - Keynote speaker 2017 Modern Math Workshop at SACNAS, Salt Lake City Convention Center, Utah, October 2017
 - Plenary speaker 2017 SIAM conference in Applied Algebraic Geometry, Georgia Tech, July 2017.
 - Plenary speaker 2016 USA Mathematics Olympiad Award Ceremony, US State Department, Washington DC June 2016.
 - Plenary speaker 2015 Summer School “Convex Geometry: Discrete and Computational” TU Berlin, June-July 2015.
 - Plenary speaker 2014 West Coast Optimization Meeting, September 2014, Surrey Canada

- Plenary Speaker MAA southern California section annual meeting, October 2013
- Plenary Speaker, “Polynomial Optimization”, Newton Institute Cambridge UK, July 2013.
- Plenary Speaker AMS Western Section Meeting Boulder Colorado, April 2013
- Plenary Speaker Anderson Lecture at the Louisiana Mississippi MAA Section Conference, March, 2014
- Plenary Speaker, MAA Halmos Distinguished Lecture Series, Carriage House Conference Center, Washington DC September 2012
- Workshop speaker, “Mixed-Integer Programming 2013”, UC Davis, July 2012
- Plenary Speaker Bay Area Discrete Math Day, March 2012
- Plenary Speaker, Triangle Lectures in Combinatorics, Univ. of North Carolina, Chapel Hill, November 2011
- Plenary Speaker Atul Vyas Memorial Lecture, Claremont Mckenna College, November 2011
- Plenary Speaker XX Coloquio Victor Neumann-Lara de Teoria de las Graficas, Combinatoria y sus Aplicaciones, Pachuca Mexico, February 2011
- Plenary invited topical speaker SIAM Annual meeting, Pittsburgh, July 12-16, 2010.
- Plenary Speaker, Second Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), Montreal, May 2009
- Plenary speaker, Fourth International Symposium of Combinatorial Computing (4ICC), University of Auckland New Zealand, December 2008.
- Keynote lecturer “Rocky Mountain Mathematics Consortium Summer School: Polyhedral Geometry and Algebraic Combinatorics”, Laramie Wyoming, June 20-July 1, 2011.
- Keynote Lecturer, Summer Seminar of the North Central Section of the MAA, St. John’s University Minnesota, July 2009
- Plenary speaker DIAMANT/EIDMA symposium Netherlands (2007)
- Plenary speaker MAA Golden Section (CA,NV, HI), annual meeting March (2008), Sacramento, CA
- Plenary Speaker MAA Mathfest, Knoxville Tennessee (2006)
- Plenary Lecturer, IMA Tutorial on “Algebraic Geometric Methods in Engineering”, September 2006, IMA Minneapolis MN
- Plenary Lecturer, Doctoral school on: “Optimization over Polynomials and Semidefinite Programming” University of Klagenfurt (Austria), September 2005.
- Plenary Lecturer, International Summer School on Geometric and Algebraic approaches for Integer Programming, University of Lisbon, Portugal, July 2005
- Plenary Speaker, XI Encuentros de Geometria Computacional Santander Spain, June 2005

- Plenary speaker, CBMS conference on *Integer points in Polyhedra: Geometry, Number Theory, Algebra, Optimization* Snowbird Utah (2003)
- Plenary speaker COCOA VIII (computational commutative algebra) Cadiz Spain (2003)
- Plenary speaker conference COMBINATEXAS (2001),
- *Invited Department-wide Colloquium Speaker*
 - Colloquium speaker University of Kansas, April 2022 (online)
 - Colloquium Kieval Lectures at Humboldt State University, April 2022.
 - Colloquium Sociedad Matematica Mexicana, December 2020 (online due to COVID).
 - Colloquium H.B Keller lecture, Computational Mathematics, Caltech November 2020 (online due to COVID).
 - Colloquium speaker, San Diego State University, October 2019
 - Colloquium speaker, University of Texas, Brownsville, September 2019
 - Colloquium speaker, George Mason University, April 2019.
 - Colloquium speaker, Illinois Institute of Technology, February 2019.
 - Colloquium speaker, San Jose State University, December 2018.
 - Colloquium speaker, CORE interdisciplinary seminar, Univ. of Washington Seattle, November 2018.
 - Colloquium speaker, Univ. of California Irvine, May 2018.
 - Colloquium speaker, Texas State Univ., February 2018
 - Colloquium speaker, Clemson University Dept. of Math, January 2018
 - Colloquium speaker, North Carolina State Univ, November 2016
 - Colloquium Georgia Tech, Atlanta, Feb 2016
 - Colloquium Univ., of California Los Angeles, Jan 2016
 - Colloquium John Hopkins Univ. November 2015
 - Colloquium Technical Univ. of Berlin, October 2015
 - Colloquium Claremont Mckenna College, September 2015
 - Colloquium Instituto de Matemáticas UNAM, March 2015
 - Colloquium University of San Francisco, September 2014
 - Colloquium of Illinois Institute of Technology, October 2013
 - Colloquium of Technical University of Munich, June 2013
 - Colloquium Applied and Computational Mathematics, October 2012
 - Colloquium George Mason University, September 2012
 - Colloquium George Washington University DC, September 2012
 - Colloquium, Operations Research Center Colloquium, MIT, September 2008

- Colloquium of Rice University Computational Applied Math Dept. April 2008.
 - Colloquium Speaker, Sonoma State Univ., April 2008
 - Colloquium speaker Dept. of Applied Mathematics, MIT (2006),
 - Colloquium speaker Technische Universität Berlin, December 2004),
 - Colloquium speaker Dept. of Mathematics Univ. of California Berkeley (2003),
 - Colloquium speaker Dept. of Mathematics, Santa Clara Univ, March (2003)
 - Colloquium speaker Dept of Mathematics, UC Santa Cruz, October (2003)
 - Colloquium speaker Dept. of Computer Science, Hong Kong University (2002),
 - Colloquium speaker Dept. of Operations Research and Industrial Engineering UC Berkeley (2000)
 - Colloquium speaker, Dept. of Mathematics, Purdue University Lafayette (1998)
 - Colloquium speaker, Courant Institute of Mathematical Sciences New York (1998)
- *Invited Workshop or Specialized Conference Speaker*
 - Summer School Lecturer, Escuela Colombiana de Combinatoria “Geometric methods in Combinatorics” (ECCO 22 Bogota Colombia) June 2022
 - Conference speaker in Honor of Gerard Cornuejols 70th birthday, Pittsburgh, May 2022
 - Workshop speaker “Ehrhart polynomials: inequalities and extremal constructions”, American Institute of Mathematics, May 2022 .
 - Workshop speaker “Algebraic Statistics 2022”, University of Hawai‘i at Manoa, May 2022.
 - Workshop speaker (online) Oberwolfach “Discrete Geometry”, September 2020.
 - Workshop speaker AMS Fall Central Section “Algebraic, geometric and topological combinatorics” session September 2020.
 - Workshop speaker “MIP 2020”, May 2020 (online)
 - Workshop speaker “Helly and Tverberg-Type Theorems” Casa Matematica Oaxaca-BIRS, October 2019
 - Workshop speaker Oberwolfach “Geometric, Algebraic, and Topological Combinatorics” August 2019
 - Workshop speaker “10th Cargese Conference on Combinatorial Optimization”, November 2018
 - Workshop speaker “Combinatorial Geometries 2018: matroids, oriented matroids and applications”, CIRM, Marseille-Luminy, France, September 2018.
 - Workshop ?Algebraic, Geometric and Topological Methods in Combinatorics? session at AMS Sectional Meeting, Boston, MA. April 2018
 - Workshop speaker “Modern Mathematics” at SACNAS meeting, October 2017.

- Workshop speaker, “Lattice Polytopes”, Einstein Foundation, Berlin, December 2016.
- Workshop speaker “Polyhedral geometry and partition theory” American Institute of Mathematics, November 2016.
- Workshop speaker “Transversal, Helly and Tverberg type Theorems in Geometry, Combinatorics and Topology III,” Casa Matematica Oaxaca BIRS, October 2016.
- Workshop speaker “Discrete Optimization” Forschung Institut Mathematik, ETH Zurich. August 22-26, 2016.
- Workshop speaker Oberwolfach “Topological and Algebraic Combinatorics”, February 2015
- Workshop speaker IMA “Enumerative and Geometric Combinatorics”, November 2014.
- Workshop speaker AMS Special Session on Polyhedral Number Theory, October 2014
- Workshop speaker “Recent Advances in Linear Optimization”, Paris, July 2014
- Workshop speaker “SIAM optimization annual meeting, San Diego California May 2014
- Workshop speaker “Optimization, Moment problems and geometry”, Singapore, November 2013
- Workshop speaker Clifford Lectures, Tulane University, March 2010
- Workshop speaker AIM workshop on “Convex algebraic geometry, optimization and applications”
- Workshop speaker AIM workshop on “Combinatorial challenges in toric varieties”, April 2009,
- Invited speaker, workshop High Performance Optimization Techniques (HPOPT), Tilburg Netherlands, June 2008.
- Workshop speaker, “Mixed-Integer Nonlinear Optimization: Algorithmic Advances and Applications”, IMA Minnesota, November (2008)
- Workshop Speaker, “Polyhedral Computation”, October, 2006, Centre de Recherche Mathematique, Montreal Canada
- Workshop speaker, “Convex Sets and their Applications”, International Research Station, Banff, Canada (2006)
- Workshop speaker, “Algorithmic, Combinatorial and Applicable Real Algebraic Geometry”, MSRI Berkeley, April 2004
- Workshops speaker, “Connections in Mathematics”, Society for the Advancement of Chicano and Native Americans in Science, October 2003

• *Invited seminars presented at the following universities and conference centers:*

Combinatorics and Geometry seminar, University of Washington (online) (10/2020).
Fundación Panameña para las Matemáticas, Expository Public Lectures for children (online) (8/2020) GEOTOP-A online seminar on Applications of Geometry and Topology (online) (8/2020) Combinatorics, Games, and Optimisation seminar, London School of Economics (online due to COVID19), (7/2020) Combinatorics Seminar UC Berkeley (online due to COVID19) (4/2020) Algebra Seminar, University of Konstanz, Germany (07/2019) Seminar Industrial Engineering and Operations Research, UC Berkeley (4/2019) Seminar of Applied Mathematics, CMAP Ecole Polytechnique Paris (8/2018) Combinatorics Seminar UC Berkeley (2/2018) Dept of Mathematics, Beijing University, China (6/2017) Dept of Mathematics, Northwestern Univ, Xi'an China (6/2017) Dept of Mathematics, UC Berkeley (Applied Algebra-seminar) (4/2017) Dept. of Electrical Engineering, Univ. Liege Belgium (12/2016) Hausdorff Institute for Mathematics, Univ. of Bonn, Germany (2015) Instituto de Matemáticas, Univ. de Sevilla, Spain (2014) Dept. of Industrial and Systems Engineering, Georgia Tech (2014) Combinatorics seminar, Georgia Tech (2014) Combinatorics Seminar, Caltech (2012), National Institute of Standards and Technology (2012), Combinatorics Seminar MIT (2000), Combinatorics Seminar UC Berkeley (2000,2003, 2004,2008), Combinatorics Seminar Univ. of Washington (2010), Combinatorics Seminar, Univ of Illinois Urbana-Champaign (1998), Operations Research & Industrial Engineering UC Berkeley (2012), Algebra-Combinatorics Seminar San Francisco State Univ. (2003,2005,2006), Combinatorics seminar, Texas A & M Univ. (2007) IBM T.J Watson Research Center, NY (2007), School of Business, Operations Research Seminar, Univ. British Columbia, Canada, (2007) School of Computer Sciences McGill University Canada, CINVESTAV Mexico (1999), Univ. of Tokyo Japan (2005), Universidad Tecnica de Lisboa, Portugal (2005) Universidad Complutense Spain (2000), University of Rome Italy (2005), University of Crete Greece (2005), CWI-Amsterdam, Netherlands (2004), Universität Osnabruck Germany(2005), Technische Universität Darmstadt (2005), Universität Marburg Germany (2005), Mathematisches Institut Oberwolfach Germany (1995,2000,2005,2007,2008,2010,2012) Freie Univ. Berlin Germany (2013), Technische Univ. Berlin Germany (2004), Univ. Magdeburg Germany (2004, 2005, 2013) ETH Zürich Switzerland (1999, 2005), Oxford University UK (1996), International Centre for Theoretical Physics Trieste Italy (1994),

GRANTS & RESEARCH FUNDING:

- NSF-DMS personal grant (2000-to-2014, 2016-2019).
- NSA grant (2015-2016, 2022.).
- CONACYT-UC MEXUS grant (2013-2015).
- Lead PI, NSF VIGRE grant 2007-2013 for the UC Davis math department (3.3 Million dollars).
- Co-PI of NSF VIGRE grant 2002-2007 for the department of Mathematics.

- IBM collaborative grant, *non-standard techniques in integer optimization* (2006-2010).
- Co-PI for GAAN grant (2000-to date).
- Four NSA grants to support scientific workshops.
- Three NSF grants for scientific workshops.
- CNRS-University of California, *Computer Algebra techniques in Optimization*, Berkeley Fund Award. (2001-2002). Co-PI András Sebő.
- Swiss Federal grant *Optimization in the space of subdivisions of a polyhedron* (1998-1999). Co-PI Jürgen Richter-Gebert.

TEACHING and MENTORING:

- Has taught a wide range of undergraduate and graduate classes at the following institutions: Universidad Nacional Autónoma de México, Cornell University, University of Minnesota, ETH Zürich, University of California, Davis, Technische Universität München.

- **Ph.D students mentored:**

Maya Ahmed (2004, now working in software industry in India),

Ruriko Yoshida (2004, now at U. Kentucky tenured),

Tyrrell McAllister (2006, now at U. Wyoming, tenured),

Susan Margulies (2008, now at US Naval Academy, tenured),

David Haws (2009, now at IBM Research science staff),

Edward D. Kim (2010, now at U. Wisconsin Lacrosse, tenured),

Mohamed Omar (2011, now at Harvey Mudd College, tenured)

Yvonne Kemper (2013, now at Austrian Institute of Technology)

Brandon Dutra (2016, now at Google)

Reuben La Haye (2016, now at Google)

Jacob Miller (2016, now at Facebook)

Jamie Haddock (2018, now at UCLA Center for Applied Math.)

Lily Silverstein (2019, now at California Polytechnic Pomona.)

Thomas Hogan (2019, now at Tatari TV Inc.)

Zhenyang Zhang (2022, now at Google)

- **Current Ph.D students:**

Chengyang Wang (advanced to candidacy, Ph.D expected June 2023)

William J. Wesley (advanced to candidacy, Ph.D expected June 2023)

Edgar Jaramillo-Rodriguez (advanced to candidacy, Ph.D. expected June 2023)

Yue Wu (advanced to candidacy, Ph.D. expected June 2023)

Alexander Black (advanced to candidacy Ph.D. expected June 2024)

Felix Almendra Hernandez (Ph.D expected June 2025)

- **Master Students mentored:**

Pritpal Singh 2002

Jerry De Groot 2002

Tom Brounstein 2012

Mark Junod 2013

Rebecca Starr 2014

Michael Pernpeintner 2014 (at Technical Univ. Munich)

Annie Laurie Mauhs-Pugh 2016

Moise Blanchard 2018 (at École Polytechnique Paris)

Sabrina Enriquez 2020

- **former Postdoctoral Fellows:**

Dr. Raymond Hemmecke (now at Heureka Business GmbH)

Dr. Ruchira Datta (now at UC San Francisco)

Dr. Matthias Köppe (now at UC Davis, full professor)

Dr. Fu Liu (now at UC Davis, full professor)

Dr. Peter Malkin (now at Billington Inc. Australia)

Dr. Steve Klee (now at Seattle University, associate professor)

Dr. Steffen Borgwardt (now at Univ. Colorado, Denver, assistant prof. tenure-track)

Dr. Elisabeth Finhold (now at Fraunhofer Institute for Industrial Mathematics)

Dr. Chris O'Neill (now at San Diego State Univ, assistant prof. tenure-track)

Dr. Anastasia Chavez (now at St. Mary's College, assistant prof. tenure-track)

- **Undergraduate students** Just at UC Davis I have had more than 60 undergraduates conduct research under his supervision (with close to half of them going to graduate school afterwards or finishing and undergraduate honors thesis). At UC Davis alone he has supervised the work projects of the following students (those that went to graduate school marked with schools names, senior thesis with asteriks):

Amber Johnston, Cynthia Miranda* (CSU Long Beach), Marisa Garcia, Natasha Slepoy* (Columbia Univ), Jon Brooks, Jeremiah Tauzer* (Purdue U.), Peter Huggins* (UC Berkeley), David Haws* (UC Davis), Austin Shapiro* (Univ. Michigan),

Michael Zhang, Esteban Pauli* (U. Illinois Urbana), Carol Hshi, David Karapetyan* (USC), Katherine Stalder* (Stanford), Creed Erickson* (UC Davis), Luis de la Torre* (Northwestern U), Tia Baker, Servando Narvaez * (UC Berkeley), Allison O’Hair* (MIT), Matthew Vicksell, Karla Lanzas* (San Francisco State), Rex Cheung* (UC Davis), Nancy Tafolla* (San Diego Univ.), Courtney Dostie, Katherine Burggraf*, Brandon Dutra* (UC Davis), Timothy Ingram* (Stanford), Samantha Cappozo, Jianqiu Wu* (Rice U.), Stanislav Moreinis* (Stanford), Gregory Pinto, Ying Shi* (UC Berkeley), Longphi Nguyen* (UC Davis), Yuan Yuan Shen* (Stanford), Laila Rizvi, Connor Duthie, Victor Fuentes*(Univ. Michigan), Jacqueline Rodriguez* (UCLA), Hanna Polterock, Melody Molander (Univ. of Oklahoma), Emily Macway (UC Santa Barbara), Brendon Verissimo, Samuel Asher, Corina Putinar, Miguel Gil (San Jose State), Carmen Galaz (UC Santa Barbara), Leonardo Ferrer (UC Davis), Alberto Flores, Alicia Figueroa, Maya Nelson, Megan Liska* (Georgetown Univ), Jianping Pan (UC Davis), Kevin Sumner*, Benjamin Bairrington*, Li Li (Univ. of Washington), Sean O’Cleary, Morgan Imel, Arina Ushakova (UC Davis), Trevor Chan* (UC Davis), Jenette Sellin (Friedrich Schiller Univ. Germany), Mengda Xu*(CMU), Matthew Corbelli, Santiago Rodriguez, Alondra Horta, and Dominic Yang* (UCLA), Lingyun Ye, Yuanbo Li*(Georgia Tech), Zekai Zhao*(Carnegie Mellon), Maira Hurtado, Chutong Wu* (UC Davis), Michi Kirihara*, Tzu Feng-Leung*, Bohan Yang (NYU), Limin Huang*, and Michael Chu*(NYU). Owen Gao*, Yuan Chang*(UCSD).

PROFESSIONAL SERVICE

Editorial and Referee Work:

- Chief Editor for
 - SIAM-MOS series of books in Optimization (2019-to date)
- Associate Editor for
 - *SIAM Journal of Discrete Mathematics* (2010-to date).
 - *Boletín de la Sociedad Matemática Mexicana*, (2016-to date).
 - *SIAM Journal for Applied Algebra and Geometry* (From 2016 until 2020).
 - *Discrete Optimization* (From 2009 until 2014).
- Guest Co-editor special issue on “Geometric Combinatorics”, 148 pages, “Discrete and Computational Geometry” Volume 27, Number 1, 2002.
- Reviewer for Mathematical Reviews, Zentralblatt für Mathematik since 1995.
- Referee for the following journals and conferences (many of them multiple times):

Journal of the American Mathematical Soc. Discrete and Computational Geometry, Operations Research,	Discrete Applied Mathematics, Journal of Pure and Applied Algebra, Mathematical Programming (A,B),
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American Mathematical Monthly,
 Boletín de la Sociedad Matemática Mexicana,
 Computational Geometry: Theory and Apps.,
 Journal of Symbolic Computation,
 Journal of Optimization Theory and Apps.
 Discrete Optimization,
 Journal of Algebraic Combinatorics,
 Advances in Mathematics
 SIAM Journal of Discrete Mathematics
 SIAM journal of Optimization
 Discrete Mathematics
 Amer. Math. Soc. Memoirs
 Journal of Combinatorial Theory (A,B),
 Journal of Commutative Algebra
 Journal of Algebraic Statistics
 Experimental Mathematics
 American Math. Monthly
 Vietnam Journal of Mathematics,
 ACM transactions on Mathematical Software
 IPCO Symposium on Integer Programming and Combinatorial Optimization 1999, 2013, 2019, 2021
 ACM-SIAM symposium in Computational Geometry (SOCG) 1999, 2000, 2001, 2020
 ACM Symposium on the Theory of Computing (STOC) 2016, 2017
 ACM Symposium on Discrete Algorithm (SODA) 2017, 2019, 2020.
 Formal Power Series and Algebraic Combinatorics (FPSAC) 2001.
 Effective Methods in Algebraic Geometry (MEGA) 2022.

Contributions to Discrete Mathematics,
 Advances in Applied Mathematics,
 Mathematic of Computation
 Operations Research Letters,
 Proceedings of the Amer. Math. Soc.
 Mathematika,
 Mathematics of Operations Research,
 Beitrage zur Algebra und Geometrie
 Arnold Math. Journal
 Forum of Mathematics
 SIAM Journal of Applied Algebra & Geometry
 Australasian Journal of Combinatorics
 Bulletin of the London Math. Soc.
 Bulletin of the Amer. Math. Soc.
 Electronic Journal of Combinatorics
 Notices of the Amer. Math. Soc.
 Gaceta de la Real Soc. Mat. Española.
 Combinatorics, Probability, and Computing
 Journal of Combinatorics

Notable Service to the Mathematics Community

- **Leadership Service to the mathematical societies:**

- Elected as Vice-President of the American Mathematical Society, 2021.
- Elected to the Executive Council of the American Mathematical Society (2015-2019).
- Elected member of the American Mathematical Society Council (serving in sub-committee in Education) (2013-2016).

- **Award Committees:**

- Farkas Prize Award committee, INFORMS 2021.
- George Pólya Award committee, SIAM, 2019-2021.
- Golden Section Teaching Award committee, MAA, 2020- to date.
- Hedrick Lectures selection committee, MAA 2017-to date

- Denes König Award committee, SIAM 2018.
- Beckenbach book award committee, MAA 2007-2010.

• **External Evaluator or Examiner:**

- Member of special committee to evaluate NSF Division of Mathematical Sciences, 2021.
- External evaluator or panelist for grants submitted to The National Science Foundation National Security Agency (since at least 2000)
- Served as external evaluator for grants Banff International Research Station (BIRS), German Science Foundation (DFG), Humboldt Foundation, Hungarian Scientific Research Fund (OTKA).
- External tenure reviewer or promotion evaluator for Harvey Mudd College (2005), University of New Brunswick (2008), Washington State University, Pullman (2009), Oberlin College (2011), Hebrew University of Jerusalem (2012), Oakland University (2012), University of Illinois Urbana-Champaign (2013) University of Kentucky (2013, 2019), Korea Advanced Institute of Science and Technology (2014), Claremont McKenna College (2014), Goethe-University Frankfurt Germany (2015), Princeton University (2016), CIMAT Mexico (2016), Georgia Tech (2018, 2019), Clemson University (2018), Williams College (2019), North Carolina State Univ. (2019) Texas state Univ. (2019), Univ. of Miami (2020), ITAM Mexico (2020), Simon Fraser Univ. (2020). Carnegie Mellon Univ. (2020), John Hopkins University (2021) Oxford Univ. (2022).
- Evaluator for book proposals for Springer Verlag, Oxford University Press, Sociedad Matematica Mexicana.
- Examination committee “Habilitation pour diriger de recherche” University of Marseille, France, December 2021.
- Evaluation committee for faculty position at Ludwig Maximilians University, Munich Germany, May 2021.
- Evaluation committee for faculty position at Universität des Saarlandes, Germany, January 2021.
- Evaluation committee for faculty position Universität Bremen Germany, October 2018.
- Ph.D examination of Mr. Fabian Klemm (Technical University Munich) December 2020.
- Ph.D examination of Ms. Katharina Schaar (Technical University Munich) March 2017.
- Ph.D examination of Ms. Pauline Sarrabezoles (Ecole des Ponts, Paris) July 2015.
- Evaluation committee of faculty position candidates at Technical Univ. Berlin, May 2012

- Evaluation committee of Faculty position at University of Aarhus, Denmark, July 2010

- **Scientific boards and committees**

- Scientific program committee member IPCO XVI, Georgia Tech, Atlanta, 2021.
- Elected to the Scientific Board of the American Institute Mathematics, 2019 to date
- Elected to Scientific Board of Institute for Computational and Experimental Mathematics (ICERM), Brown University, From 2018 to 2021.
- Member scientific program committee special program on *Inverse Moment Problems*, Institute for Mathematical Sciences (IMS) at the National University of Singapore, Singapore, (Nov. 2013-Jan 2014).
- Member scientific program committee “Mexican Conference on Discrete Mathematics and Computational Geometry”, Oaxaca Mexico, November 2013.
- Co-Chair of the Scientific Committee LAGOS VII, Playa del Carmen, Mexico, April 2013.
- Scientific program committee member IPCO XVI, Valparaiso Chile March 2013.
- Scientific program committee member LATIN 2010 (Latin American Theoretical Informatics), Oaxaca Mexico, April 2010.
- Organizing and Scientific committee MIP 2009 (Mixed Integer Programming), Berkeley, June 2009.
- Scientific committee member and co-organizer “Geometric Combinatorics” Satellite conference of the International Congress of Mathematicians, Alcalá de Henares, Spain, 2006.
- Scientific program committee member IPCO XI, Berlin Summer 2005.
- Program committee member ACM-SIAM symposium on Computational Geometry Boston June 2001.

Conference and Scientific programs organized

- Co-organizer “Combinatorial, Computational, and Applied Algebraic Geometry”, Seattle 2022 (CCAAGS22) June 2022.
- Co-organizer Hausdorff Institute of Mathematics, Bonn University, “Tropical geometry and the geometry of linear programming”, September 2021.
- Co-organizer American Institute of Mathematics research network “Latinx Mathematicians Research Network”, June 2021
- Co-organizer American Institute of Mathematics workshop “Latinx Mathematicians Network II”, December 2019.

- Co-organizer Mini-symposium “Algebraic and geometric methods in optimization”, part of SIAM Conference on Applied Algebraic Geometry, (Bern Switzerland) July 2019.
- Co-organizer Max Planck Institute for Mathematics in the Natural Sciences (Leipzig Germany) “Randomness and Learning in Non-linear Algebra”, June 2019.
- Co-organizer special session on ”Algebraic and Geometric Methods in Discrete Optimization” aJoint Mathematics Meetings in Baltimore, MD, January 2019.
- Co-organizer American Institute of Mathematics workshop “Latinx Mathematicians Network I”, December 2018.
- Co-organizer Mathematisches Forschung Institut Oberwolfach workshop on “Combinatorial Optimization”, November 2018.
- Co-organizer Institute for Computational and Experimental Mathematics (ICERM) workshop on “Core computational methods” part of the special semester “Non-Linear Algebra September 2018
- Co-organizer Mathematisches Forschung Institut Oberwolfach workshop on “New directions in Stochastic Optimisation”, August 2018.
- Co-Chair, MSRI-Berkeley special semester in “Geometric and Topological Combinatorics” Fall 2017. A semester long program that attracted several dozens of experts and included three workshops.
- Co-chair, Bay Area Optimization BAYOPT2017: From Data to Decisions, UC Davis May 2017, conference in honor of Roger Wets 80th Birthday. More than 70 participants.
- Lead organizer, MAA Golden Section meeting at UC Davis, February 2016. Meeting attended by over 250 participants.
- Co-organizer discussion panel ”What is a Mathematics PhD?” at Joint Math. Meeting Seattle January 2016
- co-organizer Casa Matematica Oaxaca, *Advances in Discrete Optimization*, November 2015.
- Co-organizer Mathematical Research Communities program Snowbird Utah, June 2014.
- Co-organizer, special session on Convexity, Combinatorics and Topology at First Mathematical Congress of the Americas, Guanajuato August 2013
- chair organizer “Convexity, Topology, Combinatorics & Beyond, an international workshop”, Puerto Vallarta Mexico, October 2011.

- “Workshop on Optimization”, Fields Institute, Toronto Canada, September 2011. Program on Discrete Geometry and Applications
- “Conference on Discrete Geometry and Optimization”, Fields Institute, Toronto Canada, September 2011. Program on Discrete Geometry and Applications
- “Workshop on Discrete Geometry”, Fields Institute, Toronto Canada, September 2011. Program on Discrete Geometry and Applications
- Chair for Workshop “Efficiency of the Simplex Method: Quo vadis Hirsch conjecture?”, UC Los Angeles IPAM, January 2011.
- co-organizer “Algebraic Techniques for Optimization” SIAM conference on Discrete Mathematics, University of Victoria, British Columbia, 2006.
- co-organizer “Inside the Cube: Algebra, Combinatorics, and Geometry”, Magdeburg Germany, 2005.
- co-organizer Oberwolfach workshop on “Ehrhart Quasi-Polynomials”, Summer 2004.
- co-organizer AIM workshop on “Algebraic Statistics” Winter 2003.
- Co-Chair, MSRI-Berkeley special semester in “Discrete and Computational Geometry” Fall 2003. A semester long program that attracted several dozens of experts and included three workshops.
- Co-organizer AMS session of “Algebraic and Geometric Combinatorics” San Francisco 2000.
- Founding member “Bay Area Discrete Math Day”, a semi-annual regional meeting, (since 2000 main discrete math/combinatorics meeting in Northern California).

Notable Service to the University Community

University-wide Service (some multiple times)

- Vice chair, Faculty Executive Committee, College of Letters and Science
- Chair, Faculty Executive Committee, College of Letters and Science
- Chair, Ad hoc Committee on Academic Personnel
- Member, Faculty Senate Undergraduate Council
- Member, Letters & Science College Assembly
- Math Dept. representative to MAST (Mathematics and Science Teacher Training Program)

- Steering Committee, UC Davis Institute for Latin America, Hemispheric Institute for the Americas
- Faculty mentor CALESS (Chicano and Latino Engineers and Scientist Society), CAM-POS Faculty affiliate.
- Member, Chancellor's Blue Ribbon Committee For the Undergraduate Experience

Departmental Service (some multiple times)

- Chair of the Graduate Group in Applied Mathematics
- Vice-Chair, Undergraduate Program Committee
- Chair, (elected), Faculty Representative Committee
- Management Services Officer Hiring Committee
- Faculty Search Committee member
- Chair, KAP/VIGRE Search Committee
- Member, Faculty Representative Committee
- Undergraduate Program Committee Member
- Undergraduate student academic advisor
- Undergraduate Research Coordinator/Explore Math/Math Club/Outreach/Picnic Day
- Organizer of many seminars including Algebra and Discrete Mathematics, Optimization, Mathematics of Data and Decisions, Colloquia, Thurston Lectures.