Serkan Hoşten

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Department of Mathematics
San Francisco State University
San Francisco, CA 94132.

EDUCATION

Ph.D. August 1997 Operations Research, Cornell University, Ithaca, NY.
Minors: Mathematics, Computer Science
M.S. April 1995 Operations Research, Cornell University, Ithaca, NY.
B.S. May 1992 Industrial Engineering, Bilkent University, Ankara, Turkey.

DOCTORAL THESIS

Title "Degrees of Gröbner Bases of Integer Programs"
Advisor Professor Bernd Sturmfels

RESEARCH INTERESTS

Combinatorial commutative algebra, computational algebra, discrete geometry and combinatorics, algebraic geometry, linear and integer programming, algebraic statistics

PROFESSIONAL EXPERIENCE

Associate Professor Fall 2004 –
San Francisco State University, Mathematics Department
Member July 2004, IAS/PCMI Geometric Combinatorics
Spring 2003, MSRI Commutative Algebra
Assistant Professor Fall 2000 – Spring 2004
San Francisco State University, Mathematics Department
Fall 1998– Spring 2000
George Mason University, Mathematical Sciences Department
Visiting Scholar Spring 2000, UC Berkeley, Mathematics Department
Postdoctoral Fellow Fall 1998-Spring 1999
Mathematical Sciences Research Institute, Berkeley, CA
Visiting Assistant Professor Fall 1997-Spring 1998
George Mason University, Mathematical Sciences Department
Instructor Summers of 1996, 1997, 1998
Cornell University, Dept. of Operations Research and Industrial Engineering

GRANTS and ACADEMIC HONORS

SFSU Presidential Award for Professional Development, Spring 2003
SFSU Summer Research Grant, Summer 2001 and Summer 2002
SFSU Presidential Assigned Time, Spring 2001
John McMullen Graduate Fellowship, 1993

PUBLICATIONS

Published Articles

1. GRIN: An implementation of Gröbner bases for integer programming, (with B. Sturmfels), in "Integer Programming and Combinatorial Optimization", [E. Balas and J. Clausen, eds.] *Springer Lecture Notes in Computer Science* **920** (1995) pp. 267–276.

2. Gröbner bases in integer programming, (with R. Thomas) *Optima* **48** (1995).

3. The polytope of all triangulations of a point configuration, (with J. De Loera, F. Santos, B. Sturmfels), *Documenta Mathematica* **1** (1996) pp. 103-119.
`http://www.mathematik.uni-bielefeld.de/documenta`

4. Gröbner bases and integer programming, (with R. Thomas), in "Gröbner Bases and Applications", [B.Buchberger and F.Winkler, eds.], Cambridge University Press, *London Math. Soc. Lecture Notes Series* **251** (1998) pp. 144-158.

5. On the complexity of smooth projective toric varieties, *Tôhoku Math. J.* **50** (1998) pp. 325-332.

6. Computing Sagbi and Sagbi-Gröbner bases over PID's, (with W. W. Adams, P. Loustaunau, J. L. Miller), *Journal of Symbolic Computation* **27** (1999) pp. 31-47.

7. The associated primes of initial ideals of lattice ideals, (with R. Thomas), *Mathematical Research Letters* **6** (1999) pp. 83-97.

8. The order dimension of the complete graph, (with W. D. Morris), *Discrete Mathematics* **201** (1999) pp. 133-139.

9. Standard pairs and group relaxations in integer programming, (with R. Thomas), *Journal of Pure and Applied Algebra* **139** (1999) pp. 133-157.

10. Primary decomposition of lattice basis ideals, (with J. Shapiro), *Journal of Symbolic Computation* **29** (2000) pp. 625-639.

11. Monomial ideals, (with G. Smith), in "Computations in Algebraic Geometry with Macaulay 2" [D. Eisenbud, D. Grayson, M. Stillman and B. Sturmfels, eds.], Springer, *Algorithms and Computation in Mathematics* **8** (2001) pp. 73–100.

12. Gröbner bases and polyhedral geometry of reducible and cyclic models, (with S. Sullivant), *Journal of Combinatorial Theory, Series A* **100** (2002) pp. 277–301.

13. The vertex ideal of a lattice, (with D. Maclagan), *Advances in Applied Mathematics* **29** (2002) pp. 521–538.

14. Gomory integer programs, (with R. Thomas), *Mathematical Programming, Ser. B* **96** (2003) pp. 271–292.

15. Supernormal vector configurations, (with D. Maclagan and B. Sturmfels), *Journal of Algebraic Combinatorics* (2004) **19** pp. 297–313.

16. Ideals of adjacent minors, (with S. Sullivant), *Journal of Algebra* **277** (2004) pp. 625–642.

17. Computational algebra for bifurcation theory, (with K. Gatermann), *Journal of Symbolic Computation* **40** (2005) pp. 1180–1207.

18. Solving the likelihood equations, (with A. Khetan and B. Sturmfels), *Foundations of Computational Mathematics* **5** (2005) pp. 389–407.

19. The maximum likelihood degree, (with F. Catanese, A. Khetan, and B. Sturmfels), *American Journal of Mathematics* **128** (2006) pp. 671–697.

20. Cyclotomic polytopes and growth series of cyclotomic lattices, (with M. Beck), *Mathematical Research Letters* **13** (2006) pp. 607–622.

21. Introductory notes to algebraic statistics, (with Suela Ruffa), *Rendiconti dell'Istituto di Matematica dell'Universita di Trieste* **37** (2006) pp. 39-70.

22. Computing the integer programming gap, (with B. Sturmfels), to appear in *Combinatorica*, math.OC/0301266.

23. A finiteness theorem for Markov bases of hierarchical models, (with S. Sullivant), to appear in *Journal of Combinatorial Theory, Series A*, math.CO/0401379.

24. A survey of toric initial ideals, to appear in Proceedings of International Conference on Commutative Algebra and Combinatorics, *Ramanujan Mathematical Society Lecture Notes Series*. Available at fener.sfsu.edu/∼serkan/papers (2005).

25. Nice initial complexes of some classical ideals, (with A. Conca and R. Thomas). to appear in Proceedings of Anogia Conference on Algebraic and Geometric Combinatorics, *AMS Comtemporary Mathematics*.

Volumes Edited

1. Symbolic Computation: solving equations in algebra, geometry and engineering, (with E. Green, R. Laubenbacher and V. Powers), *AMS Contemporary Mathematics* **286** (2001).

2. Trends in Optimization, (with J. Lee and R. Thomas), *AMS Proceedings of Symposia in Applied Mathematics* **61** (2004), Providence.

3. Computational Algebraic Statistics, (with C. Meek) Special Issue of *Journal of Symbolic Computation* **41** (2006) pp. 123–254.

PROFESSIONAL ACTIVITIES

Conference Organization

• "Mid-Atlantic Algebra Days", 18-19 March 2000, GMU, (with K. Fischer and J. Shapiro).
• "Symbolic Computation: solving systems in algebra, geometry and engineering",
11-16 June 2000, AMS-SIAM-IMA Joint Research Conference, Mount Holyoke College,
(with E. Green, R. Laubenbacher and V. Powers).
• "Second Bay Area Discrete Mathematics Day", 14 April 2001, San Francisco State University, San Francisco, CA, (with J. De Loera, T. Roby and B. Sturmfels).
• "Computational Algebraic Geometry and Its Applications", 28-29 April 2001, Special Session at 2001 Spring Eastern Section Meeting of AMS, Hoboken, NJ (with F. Sottile).
• "Symbolic Computational Algebra 2002" 15-19 July 2002, ORCCA, University of Western Ontario, London, Ontario, Canada, (with R. Corless, E. Green, R. Laubenbacher, V. Powers, and G. Reid).
• "Combinatorics and Integer Programming of Multidimensional Tables", 17-20 November 2002, Invited Session at INFORMS, San Jose, CA.
• "Workshop on Computational Commutative Algebra", 13-15 March 2003, Mathematical Sciences Research Institute, Berkeley, CA, (with C. Huneke, B. Sturmfels, and I. Swanson).
• "Combinatorial Commutative Algebra and Algebraic Geometry", 3-4 May 2003, Special Session at 2003 Spring Western Section Meeting of AMS, San Francisco, CA (with E. Miller).
• "Seventh Bay Area Discrete Mathematics Day", 18 October 2003, San Francisco State University, San Francisco, CA, (with J. Gubeladze).
• "Computational Algebraic Statistics" 14-18 December 2003, American Institute of Mathematics, Palo Alto, CA, (with J. De Loera, S. Fienberg, A. Karr, and B. Sturmfels).
• "AMS Shortcourse on Discrete Optimization", 5-6 January 2004, Phoenix, AZ, (with J. Lee and R. Thomas).
• "NSF-CBMS Regional Conference: Algebraic Combinatorics of Partially Ordered Sets", 8-12 August 2005, San Francisco State University, San Francisco, CA, (with J. Gubeladze).
• "First Biology and Mathematics Day in the Bay Area", 3 December 2005, San Francisco State University, San Francisco, CA, (with J. Arsuaga, B. Sturmfels, and M. Vazquez).
• "Homological and K-Theoretical Trends in Algebraic Combinatorics", 29-30 April 2005, Special Session at 2005 Spring Western Section Meeting of AMS, San Francisco, CA (with J. Gubeladze).
• "Applications in Biology, Dynamics, and Statistics", January-March 2007, in *IMA Special Thematic Year on Applications of Algebraic Geometry.*

Conference Talks

• Special Session on Geometry of Gröbner Bases, AMS Meeting, San Francisco, April 2006.
• Special Session on Algebraic Statistics, AMS Meeting, San Antonio, January 2006.
• Special Session on Syzygies, AMS Meeting, San Antonio, January 2006.
• Bay Area Discrete Mathematics Day, UC Davis, October 2005.
• Algebraic and Geometric Combinatorics, Crete, Greece, August 2005.
• CoCoA International School on Commutative Algebra, Porto Conte, Sardinia, Italy, May 2005.
• Special Session on Algebraic Geometry, AMS Meeting, Albuquerque, October 2004.
• Special Session on Solving Polynomial Systems, AMS Meeting, Evanston, October 2004.
• School/Workshop on Algebraic Statistics and Constructive Methods in Algebraic Geometry, Politecnico di Torino, Turin, Italy, September 2004.

• Combinatorial Commutative Algebra, Oberwolfach, Germany, July 2004.
• Special Session on Geometry and Combinatorics, Joint AMS Meeting, Phoenix, January 2004.
• International Conference on Commutative Algebra & Combinatorics, Harish-Chandra Research Institute, Allahabad, India, December 2003.
• AMS-IMS-SIAM Summer Research Conference on Lattice Points in Polytopes, Snowbird, July 2003.
• EURO/INFORMS, Istanbul, Turkey, July 2003.
• Commutative Algebra and Geometry, Banff International Research Station, Banff, Canada, April 2003.
• GroStat VI (Gröbner Bases and Statistics), University of Nice-Sophia Antipolis, Menton, France, February 2003.
• INFORMS National Meeting, San Jose, November 2002.
• Geometric Convex Combinatorics, Oberwolfach, Germany, June 2002.
• Special Session on Commutative Algebra and Algebraic Geometry, AMS Meeting, Montreal, May 2002.
• INFORMS National Meeting, Miami Beach, November 2001.
• GroStat V (Gröbner Bases and Statistics), Tulane University, New Orleans, September 2001.
• CoCoA VII, (Computational Commutative Algebra), Queens University, Kingston, Canada, July 2001.
• Special Session on Geometric and Algebraic Combinatorics, AMS Western Meeting, San Francisco, October 2000.
• Workshop on Graphs, Posets, and Algorithms, DIMACS, Rutgers, August 1999.
• Special Session on Toric Ideals and Integer Programming, IMACS ACA 99, Madrid, Spain, June 1999.
• Conference on Gröbner bases, Guanajuato, Mexico, February 1999.
• INFORMS National Meeting, Seattle, November 1998.
• Special Session on Sparse Elimination Methods in Polynomial System Solving, AMS Philadelphia Meeting, April 1998.
• Special Session on Computational Commutative Algebra, Joint Mathematics Meetings, Baltimore, January 1998.
• International Symposium on Mathematical Programming, Lausanne, Switzerland, August 1997.
• Route 81 Conference on Commutative Algebra and Algebraic Geometry, SUNY Albany, January 1997.
• Special Session on Computational Algebraic Geometry, Joint Mathematics Meetings, San Diego, January 1997.
• INFORMS National Meeting, Atlanta, November 1996.
• Test Sets in Integer Programming, Berlin, Germany, October 1996.
• IPCO V (Integer Programming and Combinatorial Optimization), Copenhagen, Denmark, May 1995.
• Hungarian-American Workshop on Combinatorics, Budapest, Hungary, May 1994.

Colloquium and Seminar Talks

• Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, April 2006.
• Mathematical and Computational Biology Seminar *UC Berkeley*, February 2006.
• Combinatorics Seminar *UC Berkeley*, December 2005.
• Mathematics Colloquium, *George Mason University*, April 2005.

- Combinatorics Seminar, *UC Davis*, April 2005.
- Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, September 2004.
- Algebraic Methods Seminar, *Stanford University*, May 2004.
- Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, November 2002.
- Commutative Algebra Seminar, *MSRI*, Berkeley, September 2002.
- Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, May 2002.
- Gröbner Bases Seminar, *UC Berkeley*, March 2002.
- Combinatorics and Geometry Seminar, *University of Washington*, March 2002.
- Combinatorics Seminar, *UC Berkeley*, November 2001.
- Mathematics Colloquium, *Sonoma State*, October 2001.
- Mathematics Colloquium, *Louisiana State*, September 2001.
- Mathematics Colloquium, *CSU Hayward*, December 2000.
- Mathematics Colloquium, *San Francisco State University*, March 2000.
- Algebra Seminar, *University of Maryland*, December 1999.
- Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, November 1999.
- Optimization Seminar, *UC Davis*, November 1999.
- Geometry Seminar, *UC Davis*, November 1999.
- Mathematics Colloquium, *US Naval Academy*, October 1999.
- Discrete Geometry Seminar, *NYU*, April 1999.
- Optimization Seminar, *UC Berkeley*, March 1999.
- Commutative Algebra and Algebraic Geometry Seminar, *UC Berkeley*, February 1999.
- Algebra, Geometry, and Topology Seminar, *Bilkent University*, Turkey, January 1999.
- Mathematics Colloquium, *CUNY City College*, December 1998.
- Postdoc Seminar, *Mathematical Sciences Research Institute*, Berkeley, November 1998.
- Symbolic Computation Seminar, *Mathematical Sciences Research Institute*, Berkeley, Sep 1998.
- Algebraic Geometry Seminar, *University of Arizona*, March 1998.
- Mathematics Colloquium, *Northern Arizona University*, March 1998.
- Combinatorics Seminar, *George Washington University*, March 1998.
- Combinatorics Seminar, *MIT*, February 1998.
- Valley Algebraic Geometry Seminar, *UMass at Amherst*, October 1997.
- Mathematics Colloquium, *George Mason University*, September 1997.
- Algebraic Geometry and Combinatorics Seminar, *Cornell University*, April 1997.
- Geometry, Algebra and Topology Seminar, *Texas A & M*, December 1996.
- Discrete Optimization Seminar, *University of Trier*, Germany, October 1996.
- Combinatorics Seminar, *UC Berkeley*, September 1995.

STUDENTS

Thesis Students

- Domenico Napoletani, Mathematics, George Mason University, *Exponential Geometry*, 1999.
- Jon Freedman, Mathematics, SFSU, *Algorithms for Standard Pair Decomposition of Monomial Ideals*, Spring 2001.
- Benjamin Owens, Mathematics, SFSU, *Gröbner Bases of Toric Ideals of Matroids*, Spring 2002.
- Seth Sullivant, Mathematics, SFSU, *Toric Ideals of Graphical Models in Statistics*, Spring 2002.
- Ian Sammis, Mathematics, SFSU, *0/1 Contingency Tables and Hierarchical Models*, Spring 2003.
- Alex Milowski, Mathematics, SFSU. *Computing Irredundant Irreducible Decompositions and Scarf Complexes of Large Scale Monomial Ideals*, Spring 2004.

• Leslie Timpe, Mathematics, SFSU, *Tropical Geometry and Construction of Phylogenetic Trees*, Spring 2006.
• Bill Storti, Mathematics, SFSU, Summer 2006 (expected).