Zvi Rosen

Curriculum Vitae

University of California, Berkeley
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Education

Ph.D.	Mathematics, University of California, Berkeley. Advisor: Bernd Sturmfels.	May 2015
	Thesis: Algebraic Matroids in Applications	
M.A.	Mathematics, University of Pennsylvania. (Submatriculation joint with B.A.)	May 2011
	Master's Thesis: Graded Betti Numbers of Graph Curves	
B.A.	Mathematics, *summa cum laude*, University of Pennsylvania.	Dec 2010
	Minor in Near-Eastern Languages and Civilizations.	

Employment

Postdoctoral Researcher, University of California, Berkeley.	Sep 2017 –Present
Department of Statistics. Mentor: Yun S. Song.	
Simons Postdoctoral Fellow, University of Pennsylvania.	Jan 2016 –Aug 2017
Depts of Mathematics & Biology. Mentor: Yun S. Song.	
Visiting Researcher, The Pennsylvania State University.	Jun – Dec 2015
Department of Mathematics. Mentor: Vladimir Itskov.	

Teaching

Instructor, University of Pennsylvania.   Fall 2016
Math 320, Computer Methods in Mathematics.
Content: Theoretical and computational aspects of numerical quadrature, equation-solving, linear algebra, and differential equations.
Duties: Curriculum design; three weekly hours of instruction and one weekly office hour; writing and grading of homework assignments and quizzes; grading of final project.

Graduate Student Instructor, University of California, Berkeley.
Duties: Three weekly hours of instruction and two weekly office hours; grading of homework assignments and quizzes; writing of quizzes; grading of final exam.

Math 10B: Math for Life Sciences	Instructor: Per-Olof Persson	Spring 2014
Math 1B: Calculus 2	Instructor: Slobodan Simic	Spring 2012
Math 1B: Calculus 2	Instructor: Per-Olof Persson	Fall 2011

Fellowships & Awards

Visiting Graduate Student, Simons Institute for Computing, Berkeley	Fall 2014
Visiting Researcher, Max Planck Institute for Mathematics, Bonn	Fall 2013
Graduate Researcher, Research Training Group in Combinatorics, Berkeley	2012-2013
Phi Beta Kappa	2011

Research & Writing

Refereed Publications

1. *Algebraic tools for the analysis of state space models.* (with Nicolette Meshkat and Seth Sullivant) To appear in Proceedings of Mathematical Society of Japan, 2015 Summer Institute on Grobner bases. arXiv:1609.07985.
2. *What makes a neural code convex?* (with Carina Curto, Elizabeth Gross, Jack Jeffries, Katherine Morrison, Mohamed Omar, Anne Shiu, & Nora Youngs) SIAM Journal on Applied Algebra and Geometry, 1(1), 222-238, 2017.
3. *The geometry of rank-one tensor completion.* (with Thomas Kahle, Kaie Kubjas, and Mario Kummer) SIAM Journal on Applied Algebra and Geometry, 1(1), 200-221, 2017.
4. *Matrix completion for the independence model.* (with Kaie Kubjas) Journal of Algebraic Statistics, 8(1), 1-21, 2017.
5. *Algebraic systems biology: a case study for the Wnt pathway.* (with Elizabeth Gross, Heather A. Harrington, & Bernd Sturmfels) Bulletin of Mathematical Biology, 78, 21-51, 2016.
6. *Parameter-free methods distinguish Wnt pathway models and guide design of experiments.* (with Adam L. MacLean, Helen M. Byrne, & Heather A. Harrington) Proceedings of the National Academy of Sciences, 112(9), 2652-2657, 2015.

Non–refereed Publications

1. *Line arrangements modeling curves of high degree: Equations, syzygies, and secants.* (with Gregory Burnham, Jessica Sidman, and Peter Vermeire) Recent Advances in Algebraic Geometry: A Volume in Honor of Rob Lazarsfeld's 60th Birthday, 417, 52, 2015.

Submitted for Review

1. *Convex neural codes in dimension 1.* (with Yan X. Zhang). arXiv:1609.07985.
2. *Algebraic matroids with graph symmetry.* (with Franz Király and Louis Theran). arXiv:1312.3777.
3. *Computing algebraic matroids.* arXiv:1403.8148.

In Progress

1. *Geometry of the site frequency spectrum.* (with Anand Bhaskar and Yun S. Song)
2. *Translation elongation rates.* (with Khanh Duo Doc and Tzu-Yu Liu).
3. *Boolean implication networks for Drop-seq.* (with Khanh Duo Doc, Yun S. Song, and Yutong Wang).
4. *Hyperplane Neural Codes.* (with Vladimir Itskov and Alex Kunin).
5. *Pure Conditions and Real Framework Motions* (with Jessica Sidman, Louis Theran, and Cynthia Vinzant).

Expository Writing

1. *Graded Betti numbers of graph curves. Master's thesis at Penn.* Defended 05/2011.
2. *Graph Curves.* Expository article for Bernd Sturmfels' course in Algebraic Curves. Accessible at: `zvihrosen.com/graphcurves.pdf`

Invited Talks

- Mathematical Biology Seminar, Penn State University. — Sep 14, 2017
- SIAM Conference on Applied Algebraic Geometry, Algebraic Methods in Rigidity Theory Mini-symposium, Georgia Tech. — Aug 1, 2017
- Applied Topology Seminar, Brown University. — Apr 13, 2017
- Song Group Seminar, University of Pennsylvania. — Nov 10, 2016
- Symbolic Computation Seminar, North Carolina State University. — Sep 20, 2016
- Song Group Seminar, University of Pennsylvania. — May 18, 2016
- Large Geometric Structures & Big Data Seminar, Aalto University, Helsinki. — Nov 9, 2015
- MASS Applied Algebraic Geometry Seminar, Penn State University. — Oct 14, 2015
- AMS Sectional Meeting, Loyola University, Chicago. — Oct 4, 2015
- SIAM Chapter Meeting, UC Berkeley. — Apr 20, 2015
- Applied Algebra and Network Theory Seminar, Penn State University. — Apr 8, 2015
- Symbolic Computation Seminar, North Carolina State University. — Mar 31, 2015
- Statistics Seminar, University of Kentucky. — Mar 30, 2015
- Computational Algebraic Geometry Seminar, UC Berkeley. — Dec 1, 2014
- Student Combinatorics Seminar, UC Berkeley. — Nov 24, 2014
- Lightning Talks, Industry Day, Simons Institute of Computing. — Nov 7, 2014
- AMS Fall Sectional Meeting, Combinatorial Commutative Algebra Session, San Francisco State University. — Oct 26, 2014
- Prof. J.M. Landsberg's group, Simons Institute of Computing. — Oct 23, 2014
- Combinatorics Seminar, San Francisco State University. — Oct 22, 2014
- Seminar on Algebraic Combinatorics, Ben-Gurion University of the Negev, Israel. — Dec 23, 2013
- Computational Algebraic Geometry Seminar, Max-Planck Institute for Mathematics, Bonn, Germany. — Oct 7, 2013
- Diskrete Geometrie Seminar. Freie Universität Berlin, Germany. — Jun 13, 2013
- MEGA 2013. Goethe Universität, Frankfurt, Germany (Poster Presentation) — Jun 4, 2013
- Macdonald Polynomials Seminar, UC Berkeley. — May 3, 2013
- Valley Geometry Seminar, UMASS Amherst. — Apr 5, 2013
- Bernd Sturmfels' Combinatorial Commutative Algebra course, UC Berkeley. — Nov 2012
- ECCO'12 Combinatorics Conference, Universidad de Los Andes, Bogotá. — Jun 2012
- Bernd Sturmfels' course in Algebraic Curves, UC Berkeley. — Dec 2011

Workshops & Conferences

- Third NYA Population Genomics Workshop, Columbia University, New York, NY — Jan 2017
- 2016 Conference on Theory & Biology, Simons Foundation, New York, NY — Apr 2016
- SAMSI Neural Network Workshop, Research Triangle Park, NC. — Mar 2016
- Second NYA Population Genomics Workshop, Princeton University, Princeton, NJ — Jan 2016
- Joint Mathematics Meetings, San Antonio, TX — Jan 2015
- IMA Modern Applications of Representation Theory, University of Chicago. — July 2014
- AMS Math Research Communities: Algebraic and Geometric Methods in Applied Discrete Mathematics. Snowbird, UT. — June 2014
- Algebraic Statistics 2014. Illinois Institute of Technology, Chicago, IL. — May 2014
- Summer School in Algebraic Statistics, Nordfjordeid, Norway. — June 2013

Service

❖ *Conference Organizing.* Organized, jointly with Yun S. Song and Khanh Dao Duc, two conferences at the Univ of Pennsylvania:

—2nd Annual Penn Symposium on Mathematical & Computational Biology   May 22-23, 2017

—Penn Symposium on Mathematical & Computational Biology   May 23-24, 2016

❖ *Seminar Organizing.* Organized "Computational Algebraic Geometry" seminar at UC Berkeley jointly with Bernd Sturmfels   Fall 2014

❖ *Research Mentoring.* Mentored Yutong Wang, an undergraduate at the University of Pennsylvania, in a biostatistics project, jointly with Khanh Dao Duc.   Spring 2017 –Present

❖ *Peer Review.* Reviewed research articles for IEEE Transactions on Information Theory, Journal of Combinatorial Theory A, and MathSciNet.   Spring 2016 –Present

❖ *Grant Writing.* Worked with Heather Harrington and Bernd Sturmfels in writing the grant Royal Society International Exchanges Scheme 2014/R1 IE140219, which allowed me to visit Prof. Harrington at Oxford University in Aug 2014.   Spring 2014

❖ *Distribution of Notes and Code.* Typed and illustrated notes for various Berkeley classes and ECCO'12 conference. Wrote code for Macaulay2 and Bertini to compute algebraic matroids. Also wrote code in Sage for a matroid application in statistics. All code & notes available on my website.

References

- **Carina Curto**   ccurto@psu.edu
  The Pennsylvania State University

- **Per-Olof Persson** (Teaching)   persson@berkeley.edu
  University of California, Berkeley.

- **Yun S. Song**   yss@berkeley.edu
  University of California, Berkeley.

- **Bernd Sturmfels**   bernd@mis.mpg.de, bernd@berkeley.edu
  Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.
  University of California, Berkeley.