

# Zvi Rosen

## Curriculum Vitae

Florida Atlantic University  
777 Glades Road  
Boca Raton, FL 33431

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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

- Assistant Professor, Florida Atlantic University. Aug 2018 –Present  
Department of Mathematics.
- Postdoctoral Researcher, University of California, Berkeley. Sep 2017 –Aug 2018  
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.
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|----------------------------------|------------------------------|-------------|
| 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

MAA Project NExT Fellow, Peach'18 Cohort	2018-2019
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

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|----------------------------------|---|
| <i>Refereed Publications</i>     | 1. <i>Geometry of the sample frequency spectrum and the perils of demographic inference.</i> (with Anand Bhaskar, Sebastien Roch, and Yun S. Song) <i>Genetics</i> , genetics-300733, 2018.   |
|                                  | 2. <i>Algebraic tools for the analysis of state space models.</i> (with Nicolette Meshkat and Seth Sullivant) To appear in <i>Proceedings of Mathematical Society of Japan</i> , 2015 Summer Institute on Grobner bases. arXiv:1609.07985.                                  |
|                                  | 3. <i>What makes a neural code convex?</i> (with Carina Curto, Elizabeth Gross, Jack Jeffries, Katherine Morrison, Mohamed Omar, Anne Shiu, & Nora Youngs) <i>SIAM Journal on Applied Algebra and Geometry</i> , 1(1), 222-238, 2017.                                       |
|                                  | 4. <i>The geometry of rank-one tensor completion.</i> (with Thomas Kahle, Kaie Kubjas, and Mario Kummer) <i>SIAM Journal on Applied Algebra and Geometry</i> , 1(1), 200-221, 2017.   |
|                                  | 5. <i>Matrix completion for the independence model.</i> (with Kaie Kubjas) <i>Journal of Algebraic Statistics</i> , 8(1), 1-21, 2017.   |
|                                  | 6. <i>Algebraic systems biology: a case study for the Wnt pathway.</i> (with Elizabeth Gross, Heather A. Harrington, & Bernd Sturmfels) <i>Bulletin of Mathematical Biology</i> , 78, 21-51, 2016.  |
|                                  | 7. <i>Parameter-free methods distinguish Wnt pathway models and guide design of experiments.</i> (with Adam L. MacLean, Helen M. Byrne, & Heather A. Harrington) <i>Proceedings of the National Academy of Sciences</i> , 112(9), 2652-2657, 2015.                          |
| <i>Non-refereed Publications</i> | 1. <i>Line arrangements modeling curves of high degree: Equations, syzygies, and secants.</i> (with Gregory Burnham, Jessica Sidman, and Peter Vermeire) <i>Recent Advances in Algebraic Geometry: A Volume in Honor of Rob Lazarsfeld's 60th Birthday</i> , 417, 52, 2015. |
| <i>Submitted for Review</i>      | 1. <i>Algebraic signatures of convex and non-convex codes.</i> (with Carina Curto, Elizabeth Gross, Jack Jeffries, Katherine Morrison, Anne Shiu, and Nora Youngs). arXiv:1807.02741  |
|                                  | 2. <i>Hyperplane Neural Codes and the Polar Complex.</i> (with Vladimir Itskov and Alex Kunin). arXiv:1801.02304  |
|                                  | 3. <i>Convex neural codes in dimension 1.</i> (with Yan X. Zhang). arXiv:1609.07985.  |
|                                  | 4. <i>Algebraic matroids with graph symmetry.</i> (with Franz Király and Louis Theran). arXiv:1312.3777.  |
|                                  | 5. <i>Computing algebraic matroids.</i> arXiv:1403.8148.  |
| <i>Expository Writing</i>        | 1. <i>Graded Betti numbers of graph curves. Master's thesis at Penn.</i> Defended 05/2011.  |
|                                  | 2. <i>Graph Curves.</i> Expository article for Bernd Sturmfels' course in Algebraic Curves. Accessible at: <a href="http://zvihrosen.com/graphcurves.pdf">zvihrosen.com/graphcurves.pdf</a>   |

## Invited Talks

- CBMS: Applications of Polynomial Systems, TCU, Fort Worth, TX (Poster) June 4, 2018
- Biology & Medicine Through Mathematics Conference, VCU, Richmond, VA June 1, 2018
- Lightning Talks, BSTARS, UC Berkeley March 12, 2018
- Song Group Seminar, UC Berkeley March 5, 2018
- Mathematics Colloquium, Florida Atlantic University, Boca Raton, FL February 22, 2018
- Algebra & Biology Section, Joint Mathematics Meetings, San Diego, CA January 12, 2018
- Song Group Seminar, UC Berkeley October 18, 2017
- Mathematical Biology Seminar, Penn State University. Sep 14, 2017
- SIAM Conference on Applied Algebraic Geometry, Algebraic Methods in R 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, 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

- Mathfest, Denver, CO Aug 2018
- 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.