Steven V Sam
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EDUCATION

2008–2012	Massachusetts Institute of Technology Advisors: Richard Stanley, Jerzy Weyman	Ph.D., Math.
2004–2008	University of California, Berkeley	B.A., Math.

POSITIONS

Aug. 2015 – present	University of Wisconsin, Madison	Assistant professor
Jul. 2012 – Jul. 2015	University of California, Berkeley	Miller research fellow
Aug. 2014 – Dec. 2014	Simons Institute for Computing	Long-term participant
Aug. 2012 – May 2013	MSRI	Postdoctoral fellow

AWARDS, HONORS, GRANTS

2017–2019	Sloan research fellowship
2017–2022	NSF CAREER grant DMS-1651327, $561,510
2015–2018	NSF standard grant DMS-1500069, $154,866
Nov. 2014	Séminaire Bourbaki talk by A. Djament, "La propriété noethérienne pour les foncteurs entre espaces vectoriels [d'après A. Putman, S. Sam, et A. Snowden]"
2013, 2015	U.S. Junior Oberwolfach Fellow
2012–2015	Miller research fellowship
May 2012	Charles W. and Jennifer C. Johnson Prize (MIT)
2009–2012	Department of Defense NDSEG fellowship
2009	NSF graduate research fellowship
May 2008	UC Berkeley Mathematics departmental citation

PAPERS

Research articles:

58. **Some generalizations of Schur functors**
Steven V Sam, Andrew Snowden
arXiv:1708.06410

57. **On the (non-)vanishing of syzygies of Segre embeddings**
Luke Oeding, Claudiu Raicu, Steven V Sam
arXiv:1708.03803

56. **Hilbert series for twisted commutative algebras**
Steven V Sam, Andrew Snowden
arXiv:1705.10718

This document was compiled on October 27, 2017.

55. **Homological vanishing for the Steinberg representation**
Avner Ash, Andrew Putman, Steven V Sam
arXiv:1704.08344

54. **Regularity bounds for twisted commutative algebras**
Steven V Sam, Andrew Snowden
arXiv:1704.01630

53. **Regularity of FI-modules and local cohomology**
Rohit Nagpal, Steven V Sam, Andrew Snowden
arXiv:1703.06832

52. **GL-equivariant modules over polynomial rings in infinitely many variables. II**
Steven V Sam, Andrew Snowden
arXiv:1703.04516

51. **Invariant theory of $\bigwedge^3(9)$ and genus 2 curves**
Eric M. Rains, Steven V Sam
arXiv:1702.04840

50. **Noetherianity of some degree two twisted skew-commutative algebras**
Rohit Nagpal, Steven V Sam, Andrew Snowden
arXiv:1610.01078

49. **Towards Boij–Söderberg theory for Grassmannians: the case of square matrices**
Nicolas Ford, Jake Levinson, Steven V Sam
arXiv:1608.04058

48. **Syzygies of bounded rank symmetric tensors are generated in bounded degree**
Steven V Sam
Math. Ann. **368** (2017), no. 3, 1095–1108, arXiv:1608.01722

47. **Questions about Boij–Söderberg theory**
Daniel Erman, Steven V Sam
Surveys on recent developments in algebraic geometry, 285–304, Proc. Sympos. Pure Math. **95**, Amer. Math. Soc., Providence, RI, 2017, arXiv:1606.01867

46. **Vector bundles on genus 2 curves and trivectors**
Eric M. Rains, Steven V Sam
arXiv:1605.04459

45. **Infinite rank spinor and oscillator representations**
Steven V Sam, Andrew Snowden
J. Comb. Algebra **1** (2017), no. 2, 145–183, arXiv:1604.06368

44. **Combinatorial constructions of derived equivalences**
Daniel Halpern-Leistner, Steven V Sam
arXiv:1601.02030

43. **Ideals of bounded rank symmetric tensors are generated in bounded degree**
Steven V Sam
Invent. Math. **207** (2017), no. 1, 1–21, arXiv:1510.04904

42. **Supernatural analogues of Beilinson monads**
Daniel Erman, Steven V Sam
Compos. Math. **152** (2016), no. 12, 2545–2562, arXiv:1506.07558

41. **Equations for the fifth secant variety of Segre products of projective spaces**
Luke Oeding, Steven V Sam
Exp. Math. **25** (2016), no. 1, 94–99, arXiv:1502.00203

40. **Noetherianity of some degree two twisted commutative algebras**
Rohit Nagpal, Steven V Sam, Andrew Snowden
Selecta Math. (N.S.) **22** (2016), no. 2, 913–937, arXiv:1501.06925

39. **Proof of Stembridge's conjecture on stability of Kronecker coefficients**
Steven V Sam, Andrew Snowden
J. Algebraic Combin. **43** (2016), no. 1, 1–10, arXiv:1501.00333

38. **The cone of Betti tables over three non-collinear points in the plane**
Iulia Gheorghita, Steven V Sam
J. Commut. Algebra **8** (2016), no. 4, 537–548, arXiv:1501.00207

37. **Representations of categories of G-maps**
Steven V Sam, Andrew Snowden
J. Reine Angew. Math., to appear, arXiv:1410.6054

36. **On Cohen–Macaulayness of S_n-invariant subspace arrangements**
Aaron Brookner, David Corwin, Pavel Etingof, Steven V Sam
Int. Math. Res. Not. IMRN (2016), no. 7, 2104–2126, arXiv:1410.5096

35. **Gröbner methods for representations of combinatorial categories**
Steven V Sam, Andrew Snowden
J. Amer. Math. Soc. **30** (2017), 159–203, arXiv:1409.1670

34. **Representation stability and finite linear groups**
Andrew Putman, Steven V Sam
Duke Math. J. **166** (2017), no. 13, 2521–2598, arXiv:1408.3694

33. **Orthosymplectic Lie superalgebras, Koszul duality, and a complete intersection analogue of the Eagon–Northcott complex**
Steven V Sam
J. Eur. Math. Soc. (JEMS) **18** (2016), no. 12, 2691–2732, arXiv:1312.2255

32. **Jacobi–Trudi determinants and characters of minimal affinizations**
Steven V Sam
Pacific J. Math. **272** (2014), no. 1, 237–244, arXiv:1307.6630

31. **Homology of analogues of Heisenberg Lie algebras**
Steven V Sam
Math. Res. Lett. **22** (2015), no. 4, 1223–1241, arXiv:1307.1901

30. **Representations of rational Cherednik algebras of $G(m, r, n)$ in positive characteristic**
Sheela Devadas, Steven V Sam
J. Commut. Algebra **6** (2014), no. 4, 525–559, arXiv:1304.0856

29. **Jack polynomials as fractional quantum Hall states and the Betti numbers of the $(k+1)$-equals ideal**
Christine Berkesch, Stephen Griffeth, Steven V Sam
Comm. Math. Phys. **330** (2014), no. 1, 415–434, arXiv:1303.4126

28. **Tropicalization of classical moduli spaces**
Qingchun Ren, Steven V Sam, Bernd Sturmfels
Math. Comput. Sci. **8** (2014), no. 2, Special issue on computational algebraic geometry, 119–145, arXiv:1303.1132

27. **Littlewood complexes and analogues of determinantal varieties**
Steven V Sam, Jerzy Weyman
Int. Math. Res. Not. IMRN (2015), no. 13, 4663–4707, arXiv:1303.0546

26. **Stability patterns in representation theory**
Steven V Sam, Andrew Snowden
Forum Math. Sigma **3** (2015), e11, 108 pp., arXiv:1302.5859

25. **The cone of Betti tables over a rational normal curve**
Manoj Kummini, Steven V Sam
Commutative Algebra and Noncommutative Algebraic Geometry, 251–264, *Math. Sci. Res. Inst. Publ.* **68**, Cambridge Univ. Press, Cambridge, 2015, arXiv:1301.7005

24. **Alternating trilinear forms on a 9-dimensional space and degenerations of $(3,3)$-polarized Abelian surfaces**
Laurent Gruson, Steven V Sam
Proc. Lond. Math. Soc. (3) **110** (2015), no. 3, 755–785, arXiv:1301.5276

23. **Homology of Littlewood complexes**
Steven V Sam, Andrew Snowden, Jerzy Weyman
Selecta Math. (N.S.) **19** (2013), no. 3, 655–698, arXiv:1209.3509

22. **The universal Kummer threefold**
Qingchun Ren, Steven V Sam, Gus Schrader, Bernd Sturmfels
Exp. Math. **22** (2013), no. 3, 327–362, arXiv:1208.1229

21. **Derived supersymmetries of determinantal varieties**
Steven V Sam
J. Commut. Algebra **6** (2014), no. 2, 261–286, arXiv:1207.3309

20. **GL-equivariant modules over polynomial rings in infinitely many variables**
Steven V Sam, Andrew Snowden
Trans. Amer. Math. Soc. **368** (2016), 1097–1158, arXiv:1206.2233

19. **Combinatorial realizations of crystals via torus actions on quiver varieties**
Steven V Sam, Peter Tingley
J. Algebraic Combin. **39** (2014), no. 2, 271–300, arXiv:1205.5847

18. **Koszul homology of codimension 3 Gorenstein ideals**
Steven V Sam, Jerzy Weyman
Proc. Amer. Math. Soc. **142** (2014), 401–408, arXiv:1203.3168

17. **Moduli of Abelian varieties, Vinberg θ-groups, and free resolutions**
Laurent Gruson, Steven V Sam, Jerzy Weyman
Commutative Algebra (edited by Irena Peeva), 419–469, Springer, 2013, arXiv:1203.2575

16. **Equations and syzygies of some Kalman varieties**
Steven V Sam
Proc. Amer. Math. Soc. **140** (2012), 4153–4166, arXiv:1105.5756

15. **Shapes of free resolutions over a local ring**
Christine Berkesch, Daniel Erman, Manoj Kummini, Steven V Sam
Math. Ann. **354** (2012), no. 3, 939–954, arXiv:1105.2244

14. **Tensor complexes: multilinear free resolutions constructed from higher tensors**
Christine Berkesch, Daniel Erman, Manoj Kummini, Steven V Sam
J. Eur. Math. Soc. (JEMS) **15** (2013), no. 6, 2257–2295, arXiv:1101.4604

13. **Matrices with restricted entries and q-analogues of permutations**
Joel Brewster Lewis, Ricky Ini Liu, Alejandro H. Morales, Greta Panova, Steven V Sam, Yan X Zhang
J. Comb. **2** (2011), no. 3, 355–396, arXiv:1011.4539

12. **Poset structures in Boij–Söderberg theory**
Christine Berkesch, Daniel Erman, Manoj Kummini, Steven V Sam
Int. Math. Res. Not. IMRN (2012), no. 22, 5132–5160, arXiv:1010.2663

11. **Symmetric quivers, invariant theory, and saturation theorems for the classical groups**
Steven V Sam
Adv. Math. **229** (2012), no. 2, 1104–1135, arXiv:1009.3040

10. **Schubert complexes and degeneracy loci**
Steven V Sam
J. Algebra **337** (2011), 103–125, arXiv:1006.5514

9. **Generalized Ehrhart polynomials**
Sheng Chen, Nan Li, Steven V Sam
Trans. Amer. Math. Soc. **364** (2012), 551–569, arXiv:1002.3658

8. **Pieri resolutions for classical groups**
Steven V Sam, Jerzy Weyman
J. Algebra **329** (2011), Special issue celebrating the 60th birthday of Corrado De Concini, 222–259, arXiv:0907.4505

7. **Positivity theorems for solid-angle polynomials**
Matthias Beck, Sinai Robins, Steven V Sam
Beiträge Algebra Geom. **51** (2010), no. 2, 493–507, arXiv:0906.4031

6. **A finite calculus approach to Ehrhart polynomials**
Steven V Sam, Kevin M. Woods
Electron. J. Combin. **17** (2010), no. 1, Research Paper 68, 13pp., arXiv:0904.0679

5. **A bijective proof for a theorem of Ehrhart**
Steven V Sam
Amer. Math. Monthly **116** (2009), no. 8, 688–701, arXiv:0801.4432

4. **Grid graphs, Gorenstein polytopes, and domino stackings**
   Matthias Beck, Christian Haase, Steven V Sam
   Graphs Combin. **25** (2009), 409–426, arXiv:0711.4151
3. **Maximal periods of (Ehrhart) quasi-polynomials**
   Matthias Beck, Steven V Sam, Kevin M. Woods
   J. Combin. Theory Ser. A **115** (2008), 517–525, arXiv:math/0702242

Survey articles:

2. **Noetherian properties in representation theory**
   Steven V Sam
   arXiv:1707.00770
1. **Introduction to twisted commutative algebras**
   Steven V Sam, Andrew Snowden
   arXiv:1209.5122

Appendices:

1. Appendix to: Patricia Hersh, Victor Reiner, Representation stability for cohomology of configuration spaces in $\mathbf{R}^d$
   Patricia Hersh, Victor Reiner, Steven V Sam
   Int. Math. Res. Not. IMRN (2017), no. 5, 1433–1486, arXiv:1505.04196.

Software:

1. Computing inclusions of Schur modules
   Steven V Sam
   J. Softw. Algebra Geom. **1** (2009), 5–10, arXiv:0810.4666.

INVITED TALKS

Conference presentations:

27. Summer school of the IRTG (4 lectures), Texel (Netherlands), August 2017
26. "A view towards algebraic geometry" conference (David Eisenbud's 70th birthday), Martha's Vineyard, May 2017
25. KUMUNU commutative algebra conference, University of Kansas, Oct. 2016
24. Kronecker coefficients conference, City University London (England), Sep. 2016
23. International conference on representations of algebras (plenary), Syracuse, Aug. 2016
22. Algebraic combinatorics and group actions, Herstmonceux (England), July 2016
21. Free resolutions, representations, and asymptotic algebra workshop, BIRS (Canada), April 2016
20. Algorithms and complexity in algebraic geometry reunion workshop, Simons Institute, Berkeley, Dec. 2015
19. Syzygies of algebraic varieties workshop, U. Illinois, Chicago, Nov. 2015
18. Midwest commutative algebra conference, Purdue University, Aug. 2015
17. Midwest combinatorics conference (plenary speaker, 2 lectures), U. Minnesota, May 2015
16. Cohomology of finite groups workshop, Oberwolfach (Germany), May 2015
15. International conference on representation theory and commutative algebra (Jerzy Weyman's 60th birthday), U. Connecticut, April 2015

14. IMPANGA15, Bedlewo (Poland), April 2015
13. Representation theory network SPP 1388 conference, Bad Honnef (Germany), March 2015
12. Algebraic topology and applications, Université Blaise Pascal, Clermont-Ferrand (France), Oct. 2014
11. Algebraic groups and representations workshop, Université de Lyon (France), July 2014
10. "Stanley@70" (Richard Stanley's 70th birthday), MIT, June 2014
9. Macaulay2 research meeting, University of Illinois, Urbana-Champaign, June 2014
8. Algebra geometry and combinatorics day 9, Loyola University, November 2013
7. Lie Groups, Lie Algebras and their Representations workshop, UC Berkeley, October 2013
6. Algebraic groups workshop, Oberwolfach (Germany), April 2013
5. Combinatorial Commutative Algebra and Applications workshop, MSRI, December 2012
4. Algebraic geometry and complex geometry, CIRM, Marseille (France), March 2012
3. Geometric/categorical aspects of representation theory workshop (3 lectures), Hokkaido University (Japan), February 2012
2. Combinatorial algebra meets algebraic combinatorics, Lakehead University, January 2011
1. Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, Massachusetts, April 2010

Seminars and colloquiua:

50. University of Southern California, Colloquium, November 2017
49. UCLA, Algebra seminar, October 2017
48. UCLA, Colloquium, October 2017
47. UC Irvine, Algebra seminar, October 2017
46. Cornell University, Algebraic geometry seminar, September 2017
45. Princeton University, Algebraic geometry seminar, April 2017
44. University of Notre Dame, Algebra seminar, April 2017
43. University of Connecticut, Colloquium, March 2017
42. Stanford University, Algebraic geometry seminar, February 2017
41. Columbia University, Algebraic geometry seminar, October 2016
40. University of Maryland, Algebra and number theory seminar, March 2016
39. University of Utah, Commutative algebra seminar, September 2015
38. University of Utah, Colloquium, September 2015
37. Universität Bielefeld, Representation theory of algebras seminar, March 2015
36. Caltech, Algebraic geometry seminar, February 2015
35. Rice University, Colloquium, January 2015
34. UCLA, Combinatorics seminar, January 2015
33. UC Berkeley, Colloquium, November 2014
32. Institut Henri Poincaré, Mini-course on twisted commutative algebras (4 lectures), Oct. 2014
31. Université de Nice, Algebra, topology, and geometry seminar, July 2014
30. University of Michigan, Combinatorics seminar, April 2014
29. UC Berkeley, Commutative Algebra & Algebraic Geometry seminar, March 2014
28. UC Davis, Algebra and discrete math seminar, March 2014
27. University of Illinois, Urbana-Champaign, Colloquium, January 2014
26. University of Oregon, Colloquium, January 2014
25. University of Wisconsin, Colloquium, December 2013

24. University of Virginia, Algebra seminar, November 2013
23. Loyola University, Algebra and combinatorics seminar, November 2013
22. Stony Brook University, Algebraic geometry seminar, October 2013
21. San Francisco State University, Algebra-geometry-combinatorics seminar, September 2013
20. Rice University, Algebraic geometry seminar, September 2013
19. U. North Carolina, Chapel Hill, Geometric methods in representation theory, March 2013
18. UC Berkeley, Commutative Algebra & Algebraic Geometry seminar, February 2013
17. Northeastern University, Quivers and invariant theory seminar, November 2012
16. Yale University, Algebraic and tropical geometry seminar, November 2012
15. MSRI, "Boij–Söderberg theory" focus period seminar, October 2012
14. University of South Carolina, Colloquium, October 2012
13. UC Berkeley, Representation theory, geometry, combinatorics seminar, September 2012
12. Stanford University, Algebraic geometry seminar, February 2012
11. UC Berkeley, Combinatorics seminar, February 2012
10. University of Michigan, Commutative algebra seminar, January 2012
9. University of Michigan, Algebraic geometry seminar, January 2012
8. Princeton University, Arithmetic invariant theory seminar, November 2011
7. University of Minnesota, Combinatorics seminar, September 2011
6. MIT, Combinatorics seminar, September 2011
5. City University of New York, Representation theory seminar, April 2011
4. U. Illinois, Urbana-Champaign, Algebra-Geometry-Combinatorics Seminar, February 2011
3. UC Berkeley, Commutative Algebra & Algebraic Geometry Seminar, January 2011
2. Dartmouth College, Combinatorics seminar, October 2010
1. MIT, Combinatorics seminar, October 2009

ADVISING

PhD students:

2. Robert Laudone (2016 – present)
1. Hang (Amy) Huang (2016 – present)

Undergraduates:

6. James Boudouris, Sho Kawakami, Jacob Kettinger (June – July 2017, UW-Madison undergrads), through NSF RTG
5. Pallav Goyal (May – Jul. 2016, IIT Kanpur undergrad), through SN Bose Scholars.
   "Invariant theory of finite general linear groups modulo Frobenius powers", arXiv:1701.06329.
4. Iulia Gheorghita (Jul. – Sep. 2014, Caltech undergraduate), through Caltech SURF.
   "The cone of Betti tables over three non-collinear points in the plane", arXiv:1501.00207.
3. Kiho Park (Feb. – Dec. 2014, Berkeley undergraduate), Berkeley senior thesis.
   "Schubert calculus on the Grassmannian and the flag manifold"
2. Sheela Devadas (Jan. 2011 – Dec. 2012, high school / MIT undergrad), through MIT PRIMES.
   "Representations of rational Cherednik algebras of $G(m, r, n)$ in positive characteristic", arXiv:1304.0856.
1. Carl Lian (Jan. – Dec. 2011, high school / MIT undergraduate), through MIT PRIMES.
   "Representations of Cherednik algebras associated to symmetric and dihedral groups in positive characteristic", arXiv:1207.0182.

TEACHING (UNIVERSITY OF WISCONSIN)

Undergraduate:

- Math 222: Calculus II (Fall 2016)
- Math 475: Introduction to combinatorics (Fall 2015)
- Math 490: Collaborative Undergraduate Research Lab (Spring 2017)

Graduate:

- Math 740: Symmetric functions (Spring 2017)
- Math 742: Abstract algebra II (Spring 2016)
- Math 746: Topics in ring theory (Spring 2016)
- Math 847: Topics in algebra: representation stability (Fall 2017)

ORGANIZING

Conferences:

Nov. 4 – 5, 2016	Commutative algebra+ (CA+)	UW Madison
Jun. 27 – Jul. 1, 2016	Representation stability workshop	American Institute of Math.
Nov. 13 – 14, 2015	Upper midwest commutative algebra colloquium	UW Madison

Seminars and reading groups:

Spring 2017	Examples in algebraic geometry	UW Madison
Fall 2016	Positivity in algebraic geometry	UW Madison
Fall 2014 – Spring 2015	Combinatorics seminar	UC Berkeley
Spring 2013	Macdonald polynomials	UC Berkeley
Fall 2011	Cluster algebras	Northeastern/MIT
Spring 2011	Quantum groups	MIT
Spring 2008	Toric varieties	UC Berkeley