

CURRICULUM VITAE

Sam Payne

Professor of Mathematics
University of Texas at Austin
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Employment

Professor, University of Texas at Austin, 2018–
Professor, Yale University, 2017–2018
Associate Professor, Yale University, 2013–2017
Assistant Professor, Yale University, 2010–2013
Acting Assistant Professor, Stanford University, 2006–2010
Clay Mathematics Institute Research Fellow, 2006–2010

Education

Ph.D.: University of Michigan, Ann Arbor, 2006
A.B.: Princeton University, 2001

Visiting Positions

University of Tübingen, Fall 2019
DKO Visiting Professor, Manchester, September 2019
MSRI, Berkeley, Spring 2019
UC Berkeley, Fall 2018
Fields Institute, Toronto, Fall 2016
Von Neumann Fellow, Institute for Advanced Study, Spring 2015
Max Planck Institute, Bonn, Fall 2011–Spring 2012
Catholic University, Leuven, Summer 2011
Free University, Berlin, Summer 2010
MSRI, Berkeley, Fall 2009
MSRI, Berkeley, Spring 2009
Mittag-Leffler Institute, Djursholm, Spring 2007

Research Awards and Grants

NSF Grant DMS-2001502, 2020–2023
Simons Fellowship, 2018–2019
Max Planck-Humboldt Medal, 2018
NSF Grant DMS-1702428, 2017–2020
NSF CAREER Grant DMS-1149054, 2012–2017
NSF Grant DMS-1068689, 2011–2014
Clay Research Fellowship, 2006–2010
Summer Myers Thesis Prize, University of Michigan, 2006

Publications

1. *Tropical curves, graph complexes, and top weight cohomology of M_g* (with M. Chan and S. Galatius). J. Amer. Math. Soc. **34** (2021), no. 2, 565–594.
2. *Equivariant Grothendieck-Riemann-Roch and localization in operational K-theory* (with D. Anderson and R. Gonzales). Algebra Number Theory **15** (2021), no. 2, 341–385.
3. *Triangulations of simplices with vanishing local h-polynomial* (with E. Gunther, A. Moura, A. Stapledon, and J. Schuchardt). Algebr. Comb. **3** (2020), no. 6, 1417–1430.
4. *A tropical motivic Fubini theorem with applications to Donaldson-Thomas theory* (with J. Nicaise). Duke Math. J. **168** (2019), no. 10, 1843–1886.
5. *Tropical refined curve counting via motivic integration* (with J. Nicaise and F. Schroeter). Geom. Topol. **22** (2018), no. 6, 3175–3234.
6. *Diagonal splittings of toric varieties and unimodularity* (with J. Chou, M. Hering, R. Tramel, and B. Whitney). Proc. Amer. Math. Soc. **146** (2018), no. 5, 1911–1920.
7. *Combinatorial and inductive methods for the tropical maximal rank conjecture* (with D. Jensen). J. Combin. Theory Ser. A. **152** (2017), 138–158.
8. *Tropical independence II: The maximal rank conjecture for quadrics* (with D. Jensen). Algebra Number Theory **10** (2016), no. 8, 1601–1640.
9. *Nonarchimedean geometry, tropicalization, and metrics on curves* (with M. Baker and J. Rabinoff). Algebraic Geometry **3** (2016), no. 1, 63–105.
10. *Cremona symmetry in Gromov-Witten theory* (with A. Gholampour and D. Karp). Pro Mathematica **29** (2016), no. 57, 129–149.
11. *The tropicalization of the moduli space of curves* (with D. Abramovich and L. Caporaso). Ann. Sci. Éc. Norm. Sup. **48** (2015), no. 4, 765–809.
12. *Topology of nonarchimedean analytic spaces and relations to complex algebraic geometry*. Bull. Amer. Math. Soc. **52** (2015) no. 2, 223–247.
13. *On a Cohen-Lenstra heuristic for Jacobians of random graphs* (with J. Clancy, N. Kaplan, T. Leake, and M. Wood). J. Algebraic Combin. **42** (2015), no. 3, 701–723.
14. *Operational K-theory* (with D. Anderson). Doc. Math. **20** (2015) 357–399.
15. *Lifting divisors on a generic chain of loops* (with D. Carwright and D. Jensen). Canad. Math. Bull. **58** (2015), no. 2, 250–262.
16. *A note on Tutte polynomials, Jacobians, and two variable zeta functions of graphs* (with J. Clancy and T. Leake). Exp. Math. **24** (2015), no. 1, 1–7.
17. *Artificial intelligence for Bidding Hex* (with E. Robeva). Games of No Chance 4, MSRI Publications **63** (2015), 207–214.
18. *Tropical independence I: Shapes of divisors and a proof of the Gieseker-Petri Theorem* (with D. Jensen). Algebra Number Theory **8** (2014), no. 9, 2043–2066.
19. *Limits of tropicalizations* (with T. Foster and P. Gross). Israel J. Math. **201** (2014), no. 2, 835–846.

20. *On the structure of non-archimedean analytic curves* (with M. Baker and J. Rabinoff). *Contemp. Math.* **605** (2013), 93–125.
21. *Lifting tropical intersections* (with B. Osserman). *Doc. Math.* **18** (2013), 121–175.
22. *Boundary complexes and weight filtrations*. *Mich. Math. J.* **62** (2013), no. 2, 293–322.
23. *Connectivity of tropicalizations* (with D. Cartwright). *Math. Res. Lett.* **19** (2012), no. 5, 1089–1095.
24. *A note on tropical Brill-Noether theory and rank determining sets for metric graphs* (with C. M. Lim and N. Potashnik). *Int. Math. Res. Not.* (2012), no. 23, 5484–5504.
25. *Cox rings and pseudoeffective cones of projectivized toric vector bundles* (with J. González, M. Hering, and H. Süß). *Algebra Number Theory* **6** (2012), no. 5, 995–1017.
26. *A tropical proof of the Brill-Noether Theorem* (with F. Cools, J. Draisma, and E. Robeva). *Adv. Math.* **230** (2012), no. 2, 759–776.
27. *Realization spaces for tropical fans* (with E. Katz). *Combinatorial aspects of commutative algebra and algebraic geometry, Abel Symp.*, **6**, Springer 2011, 73–88.
28. *Discrete bidding games* (with M. Develin). *Electronic J. Combin.* **17** (2010), no. 1, RP 85, 40 pp.
29. *Positivity for toric vector bundles* (with M. Hering and M. Mustață). *Ann. Inst. Fourier* **60** (2010), no. 2, 607–640.
30. *Cayley decompositions of lattice polytopes and upper bounds for h^* -polynomials* (with C. Haase and B. Nill). *J. Reine Angew. Math.* **637** (2009), 207–216.
31. *Analytification is the limit of all tropicalizations*. *Math. Res. Lett.* **19** (2009), no. 3, 543–556.
32. *Lattice polytopes cut out by root systems and the Koszul property*. *Adv. Math.* **220** (2009), no. 3, 926–935.
33. *Frobenius splittings of toric varieties*. *Algebra Number Theory* **3** (2009), no. 1, 107–119.
34. *Fibers of tropicalization*. *Math. Z.* **262** (2009), no. 2, 301–311.
35. *Correction to Fibers of tropicalization*. *Math. Z.* **272** (2012), no. 3–4, 1403–1406.
36. *Toric vector bundles, branched covers of fans, and the resolution property*. *J. Algebraic Geom.* **18** (2009), no. 1, 1–36.
37. *Adelic amoebas disjoint from open halfspaces*. *J. Reine Angew. Math.* **625** (2008), 115–123.
38. *Piecewise polynomials, Minkowski weights, and localization on toric varieties*. (with E. Katz). *Algebra Number Theory* **2** (2008), no. 2, 135–155.
39. *Moduli of toric vector bundles*. *Compositio Math.* **144** (2008), no. 5, 1199–1213.
40. *Ehrhart series and lattice triangulations*. *Discr. Comput. Geom.* **40** (2008), no. 3, 365–376.
41. *Stable base loci, movable curves, and small modifications, for toric varieties*. *Math. Z.* **253** (2006), no. 2, 421–431.
42. *Equivariant Chow cohomology of toric varieties*. *Math. Res. Lett.* **13** (2006), no. 1, 29–41.
43. *Asymptotic cohomological functions of toric divisors* (with M. Hering and A. Küronya). *Adv. Math.* **207** (2006), no. 2, 634–645.

44. *Fujita's very ampleness conjecture for singular toric varieties*. Tohoku Math. J. **58** (2006), no. 3, 447–459.
45. *Ehrhart polynomials and stringy Betti numbers* (with M. Mustața). Math. Ann. **333** (2005), no. 4, 787–795.
46. *Smooth complete toric threefolds with no nontrivial nef line bundles* (with O. Fujino). Proc. Japan Acad. Ser. A. Math. Sci. **81** (2005), no. 10, 274–279.
47. *Alternating graphs* (with C. Adams, R. Dorman, K. Foley, and J. Kravis). J. Combin. Theory Ser. B **77** (1999), no. 1, 96–120.

Preprints

1. *Moduli spaces of tropical curves are simply connected* (with. D. Allcock and D. Corey)
2. *The S_n -equivariant top weight Euler characteristic of $M_{g,n}$* (with M. Chan, C. Faber, and S. Galatius)
3. *Topology of moduli spaces of tropical curves with marked points* (with M. Chan and S. Galatius)
To appear in Facets of Algebraic Geometry, Volume in Honour of William Fulton on the Occasion of his 80th Birthday (Cambridge University Press)
4. *Compactified Jacobians as Mumford models* (with K. Christ and T. Shen)
5. *The Kodaira dimensions of $\overline{\mathcal{M}}_{2,2}$ and $\overline{\mathcal{M}}_{2,3}$* (with G. Farkas and D. Jensen)
6. *Adic tropicalizations and cofinality of Gubler models* (with T. Foster)

Professional Service

1. AMS Centennial Fellowship Board, 2020–
2. Épijournal de Géométrie Algébrique Editorial Board, 2020–
3. Manuscripta Mathematica Editorial Board, 2020–
4. Selecta Mathematica Editorial Board, 2020–
5. AMS Mathematical Research Communities Advisory Board, 2014–2017

Invited Lectures

Research talks and colloquia at institutions including Berkeley, Brown, Caltech, Chicago, Columbia, ETH Zurich, Free University Berlin, Harvard, IAS, ICMS Edinburgh, IMPA, Imperial College London, Institute Mittag-Leffler, Johns Hopkins, Jussieu, MPI Bonn, Michigan, MIT, MSRI, Northwestern, NYU, Oberwolfach, Penn, Princeton, RIMS Kyoto, Stanford, Texas, Toronto, UBC, and Utah

Conferences and Workshops Organized

1. Algebraic Geometry and Polyhedra (with F. Ardila, M.-W. Cheung, Y. Len, and L. Williams), ICERM, April 2021
2. Combinatorial algebraic geometry (with A. Buch, M. Chan, J. Huh, T. Lam, L. Mihalcea, and L. Williams) ICERM semester, Spring 2021
3. Facets of algebraic geometry (with P. Aluffi, D. Anderson, M. Hering, and M. Mustata), October 2019
4. Graphs, graph homology, and moduli of curves (with H. Süß), September 2019

5. Tropical geometry and moduli spaces, ICM Satellite Conference (with O. Lorscheid, M. Melo, and J. Nicaise), August 2018
6. Nonarchimedean and tropical geometry, Simons Symposium (with M. Baker), May 2017
7. Chip-firing and tropical curves, Graduate Summer School, MSRI (with M. Baker, M. Chan, and D. Jensen), July 2016
8. Algebraic, tropical, and nonarchimedean analytic geometry of moduli spaces, BIRS-CMO (with M. Baker, M. Chan, and D. Jensen), May 2016
9. Algebraic Geometry NorthEastern Series (AGNES), Yale University (with A. Auel and J. González), April 2016
10. Nonarchimedean and tropical geometry, AMS Summer Institute in Algebraic Geometry (with A. Werner), July 2015
11. Simons Symposium on Tropical and Nonarchimedean Analytic Geometry (with M. Baker), February 2015
12. REU mini-Conference (with A. Folsom), July 2014
13. Workshop on Algebraic Foundations for Tropical Geometry, Yale University, May 2014
14. Specialization of Linear Series for Algebraic and Tropical Curves, BIRS (with M. Baker, L. Caporaso, A. Cueto, and E. Katz), April 2014
15. AMS Mathematical Research Communities Workshop on Tropical and Nonarchimedean Analytic Geometry (with M. Baker), June 2013
16. Algebraic Geometry North-East Series (AGNES) (with M. Kapranov), April 2013
17. Simons Symposium on Tropical and Nonarchimedean Analytic Geometry (with M. Baker), April 2013
18. AIM workshop on Implementing Algorithms in Macaulay 2 (with H. Abo, A. Leykin, and A. Taylor), October 2009
19. Workshop on Moduli Spaces of Curves and Gromov-Witten Theory. U Michigan (with R. Cavalieri), April 2006

Postdoctoral Fellows

Yuchen Liu, Gibbs Assistant Professor, 2017–2020 (tenure track, Northwestern U)
 Kalina Mincheva, Gibbs Assistant Professor, 2016–2020 (tenure track, Tulane U)
 Max Kutler, Gibbs Assistant Professor, 2017–2018 (postdoc, U Kentucky)
 José González, Gibbs Assistant Professor, 2014–2016, (tenure track, UC Riverside)
 Nathan Kaplan, Gibbs Assistant Professor, 2013–2015, (tenure track, UC Irvine)
 Dave Jensen, Visiting Instructor, 2013–2014, (tenure track, U Kentucky)
 Dustin Cartwright, NSF Postdoc and Gibbs Assistant Professor, 2011–2014, (tenure track, UT Knoxville)

PhD Students

Netanel Friedenberg, (Yale 2020), Postdoc at Georgia Institute of Technology
 Jeremy Usatine, (Yale 2019), Tamarkin Assistant Professor, Brown University
 Daniel Corey, (Yale 2018), RTG Postdoctoral Fellow, University of Wisconsin at Madison

Tif Shen, (Yale 2017), NSERC Postdoctoral Fellowship at UBC (declined), Data Scientist
Shaked Koplewitz, (Yale 2017), Google Software Engineer
Dhruv Ranganathan (Yale 2016), C.L.E. Moore Instructor at MIT
Yoav Len (Yale 2014), Fields-Ontario Postdoctoral Fellow

Undergraduate Research

Founding director of Summer Undergraduate Mathematics Research at Yale (SUMRY), 2013–2018

Students mentored at Yale: Alec Arana, Julien Clancy, Michael Garn, Elijah Gunther, Matthew Larson, Timothy Leake, Seung Hyun Lee, Brian Lei, Chang Mou Lim, André Moura, Natasha Potashnik, Jason Schuchardt, and Geoffrey Smith, 2011–2018

Students mentored at Stanford: Jay Bhat, Elina Robeva, and Deyan Simeonov, 2008–2010