

Zach Teitler

Department of Mathematics
Boise State University

Degrees

Ph.D. (Mathematics), University of Michigan,
2005

Dissertation: Multiplier ideals of line arrangements

Advisor: Robert Lazarsfeld

B.S. (Creative Studies–Mathematics), University of California–Santa Barbara, 2000

Employment History

Professor of Mathematics, Boise State University, 2021–Present

Associate Professor of Mathematics, Boise State University, 2014–2021

Assistant Professor of Mathematics, Boise State University, 2010–2014

Visiting Assistant Professor of Mathematics, Texas A&M University, 2007–2010

Assistant Professor of Mathematics, Southeastern Louisiana University, 2005–2008

Publications

31. Garritt Johns, Zach Teitler, *An improved upper bound for the Waring rank of the determinant*, J. Comm. Alg., to appear
30. Mats Boij, Zach Teitler, *A bound for the Waring rank of the determinant via syzygies*, Linear Alg. Appl., **587** (2020), 195–214
29. Brian Harbourne, Juan Migliore, Uwe Nagel, Zach Teitler, *Unexpected hypersurfaces and where to find them*, Michigan Math. J., to appear
28. Jarosław Buczyński, Kangjin Han, Massimiliano Mella, Zach Teitler, *On the locus of points of high rank*, European Journal of Mathematics, 2018
27. Theodosios Douvropoulos, Joachim Jelisiejew, Bernt Ivar Utstøl Nødland, Zach Teitler, *The Hilbert scheme of 11 points in \mathbb{A}^3 is irreducible*, in *Combinatorial Algebraic Geometry*, Gregory G. Smith, Bernd Sturmfels, eds., 2017, Springer
26. Zach Teitler, *Sufficient conditions for Strassen’s additivity conjecture*, Illinois J. Math., 2015 (published in 2016)
25. Jarosław Buczyński and Zach Teitler, *Some examples of forms of high rank*, Collect. Math., 2016
24. Nathan Ilten and Zach Teitler, *Product ranks of the 3×3 determinant and permanent*, Canad. Math. Bull., 2016

23. Harm Derksen and Zach Teitler, *Lower bound for ranks of invariant forms*, JPAA, 2015
22. Kent M. Neuerburg and Zach Teitler, *Decompositions of ideals of minors meeting a submatrix*, Comm. Alg., 2016
21. Nickolas Hein, Christopher J. Hillar, Abraham Martín del Campo, Frank Sottile, Zach Teitler, *The monotone secant conjecture in the real Schubert calculus* Exp. Math., 2015. (Extended version of abstract presented at MEGA 2011.)
20. Grigoriy Blekherman, Zach Teitler, *On maximum, typical, and generic ranks*, Math. Ann., 2015
19. Erik Holmes*, Paul Plummer*, Jeremy Siegert*, Zach Teitler, *Maximum Waring ranks of monomials and sums of coprime monomials*, Comm. Alg., 2016
* undergraduate co-author
18. Weronika Buczyńska, Jarosław Buczyński, Johannes Kleppe, and Zach Teitler, *Apolarity and direct sum decomposability of polynomials*, Michigan Math. J., 2015
17. Zach Teitler, *Software for multiplier ideals*, JSAG, 2015
16. Zach Teitler and Alexander Woo, *Power sum decompositions of defining equations of reflection arrangements*, J. Alg. Comb., 2015
15. Zach Teitler and Douglas A. Torrance, *Castelnuovo–Mumford regularity and arithmetic Cohen–Macaulayness of complete bipartite subspace arrangements*, JPAA, 2015
14. Weronika Buczyńska, Jarosław Buczyński, and Zach Teitler, *Waring decompositions of monomials*, J. Algebra, 2013
13. Zach Teitler, *Topological criteria for schlichtness*, Proc. Edinb. Math. Soc. (2), 2013
12. Javier Elizondo, Paulo Lima-Filho, Frank Sottile, and Zach Teitler, *Arithmetic toric varieties*, Math. Nach., 2014
11. Luis García-Puente, Nickolas Hein, Christopher J. Hillar, Abraham Martín del Campo, James Ruffo, Frank Sottile, and Zach Teitler, *The Secant Conjecture in the real Schubert calculus*, Experimental Math., 2012
10. Thomas Bauer, Cristiano Bocci, Susan Cooper, Sandra Di Rocco, Marcin Dumnicki, Brian Harbourne, Kelly Jabbusch, Andreas Leopold Knutsen, Alex Küronya, Rick Miranda, Joaquim Roé, Hal Schenck, Tomasz Szemberg, Zach Teitler, *Recent developments and open problems in linear series*, in *Contributions to Algebraic Geometry*, IMPANGA Lecture Notes, August 2012
9. Susan Cooper, Brian Harbourne, and Zach Teitler, *Combinatorial bounds on Hilbert functions of fat points in projective space*, J. Pure Appl. Algebra, 2011
8. Nero Budur, Mircea Mustață, and Zach Teitler, *The Monodromy Conjecture for hyperplane arrangements*, Geom. Dedicata, 2011
7. Christopher Hillar, Luis García-Puente, Abraham Martín del Campo, James Ruffo, Zach Teitler, Stephen L. Johnson, and Frank Sottile, *Experimentation at the Frontiers of Reality in Schubert Calculus*, Contemp. Math., 2010

6. J.M. Landsberg and Zach Teitler, *On the ranks and border ranks of tensors and symmetric tensors*, Found. Comput. Math., 2010
5. Zach Teitler, *Bounding symbolic powers via asymptotic multiplier ideals*, Ann. Univ. Pedag. Crac. Stud. Math., 2009
4. Ulrich Derenthal, Michael Joyce, and Zach Teitler, *The nef cone volume of generalized Del Pezzo surfaces*, Algebra & Number Theory, 2008
3. Zach Teitler, *A note on Mustață's computation of multiplier ideals of hyperplane arrangements*, Proc. Amer. Math. Soc., 2008
2. Zachariah C. Teitler, *On the intersection of the curves through a set of points in \mathbb{P}^2* , J. Pure Appl. Algebra, 2007
1. Zachariah C. Teitler, *Multiplier ideals of general line arrangements in \mathbb{C}^3* , Comm. Alg., 2007

Unpublished

1. Zach Teitler, *Geometric lower bounds for generalized ranks* (arXiv:1406.5145 [math.AG])

Software

3. MultiplierIdeals: a Macaulay2 package for computing multiplier ideals of special ideals including monomial ideals, monomial curves, and generic determinantal ideals.
2. ApolarIdeal: a Macaulay2 package for computing apolar ideals
1. CombinatorialIteration: a Macaulay2 package providing iterators for several common combinatorial structures

Grants and Awards

11. Simons Foundation Collaboration Grants for Mathematicians (award #354574, 2015–2020, \$35,000)
10. COAS Travel Grant, for travel to CMS Winter Meeting, Hamilton, Ontario, December 2014 (\$500)
9. COAS Travel Grant, for travel to Institute of Mathematics of the Polish Academy of Sciences, Warsaw, January 2013 (\$500)
8. Boise State University College Of Arts and Sciences (COAS) Travel Grant, for travel to AMS Sectional Meeting at University of Iowa, March 2011 (\$300)
7. (with W. Bangerth, R. Carroll, and F. Sottile) NSF SCREMS Grant “Cluster Computing for the Mathematical Sciences at Texas A&M University” (DMS-0922866, 2009–2010, \$59,480)
6. (with Kent Neuerburg) Louisiana University Board of Regents Research Competitiveness Subprogram (RCS) grant, “Geometry and Algebra of Ideals Generated by Determinants” (LEQSF(2007-10)-RD-A-28, 2007–2010, \$59,892)
5. Southeastern Louisiana University Center for Faculty Excellence, Travel Grant for travel to University of Nebraska–Lincoln, October, 2006

4. Southeastern Louisiana University Center for Faculty Excellence, Center's Innovative Teaching Initiative (CITI) grant for travel to Project NExT, 2006–7
3. Travel Grant for Emerging Faculty, Louisiana Board of Regents/NSF, March–April 2005
2. Regents-VIGRE Graduate Fellow, University of Michigan, September 2000–April 2005
1. Raymond L. Wilder Award, University of California–Santa Barbara, Department of Mathematics, June 2000

Invited Conference Presentations

26. *A bound for the Waring rank of the determinant via syzygies*, SIAM Pacific Northwest Section Biennial Meeting, Seattle University (Thematic Session on Algebra, Geometry, and Applications), October 18–20, 2019
25. *A bound for the Waring rank of the determinant via syzygies*, SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland (Session: The algebra and geometry of tensors 2: structured tensors), July 9–13, 2019
24. *A bound for the Waring rank of the determinant via syzygies*, AMS 2018 Fall Central Sectional Meeting, Ann Arbor, MI (Special Session on Commutative Algebra and Complexity), October 20–21, 2018
23. *Waring ranks*, three plenary lectures and problem session, for the *Varieties and Group Actions* workshop of the *Varieties: Arithmetic and Transformations* semester of the IMPAN (Institute of Mathematics of the Polish National Academy of Sciences), Warsaw, Poland, September 23–29, 2018
22. *Geometry of high rank loci*, Spring 2017 AMS Western Sectional, Pullman, WA (Special Session on Combinatorial and Computational Commutative Algebra and Algebraic Geometry), April 22–23, 2017
21. *Direct sum decomposability of forms*, Spring 2017 AMS Western Sectional, Pullman, WA (Special Session on Commutative Algebra), April 22–23, 2017
20. *Lower bound for ranks of invariant forms*, CMS Winter Meeting, Hamilton, Ontario, December 5–8, 2014
19. *On maximum, typical, and generic ranks*, Spring 2014 AMS Central Sectional, Lubbock, TX, April 11–13, 2014
18. *Direct sum decomposability of polynomials*, Interactions between Commutative Algebra and Algebraic Geometry II, Tulane, September 28–29, 2013
17. *Software for computing multiplier ideals*, SIAM Conference on Applied Algebraic Geometry, Colorado State University, August 1–4, 2013
16. *Direct sum decomposability of polynomials*, SIAM Conference on Applied Algebraic Geometry, Colorado State University, August 1–4, 2013
15. *Experimentation at the Frontiers of Reality in Schubert Calculus*, AAAS Pacific Division 2012 Meeting, Boise, ID, June 27, 2012

14. *Software for computing multiplier ideals*, Michigan Computational Algebraic Geometry 2012, Oakland University, May 13, 2012
13. *Ranks and Generalized Ranks*, 2011 SIAM Conference on Applied Algebraic Geometry, NCSU, October 7, 2011
12. *Software for the computation of multiplier ideals*, MEGA (Effective Methods in Algebraic Geometry), Stockholm, Sweden, June 1, 2011
11. *Ranks and generalized ranks*, Toric geometry and applications, Leuven, Belgium, June 6, 2011
10. *Ranks of polynomials*, AMS Sectional, Iowa City, March 19, 2011
9. *Combinatorial bounds for Hilbert functions and graded Betti numbers of fat point schemes*, Oberwolfach workshop on Linear Series on Algebraic Varieties, October 5, 2010
8. *Experimentation at the Frontiers of Reality in Schubert Calculus*, Joint Mathematics Meetings, January 16, 2010
7. *Experimentation at the Frontiers of Reality in Schubert Calculus*, AMS Central Section Meeting, October 18, 2009
6. (Poster) *Hilbert functions of fat point schemes*, Pan-American Advanced Study Institute (PASI) in Commutative Algebra and its Connections to Geometry, Olinda, Brazil, August 2009
5. *Experimentation at the Frontiers of Reality in Schubert Calculus*, AMS Southeastern Section Meeting, April 5, 2009
4. *Bounding Hilbert functions of fat point schemes*, AMS Fall Western Section Meeting, October 4, 2008
3. *Multiplier ideals of hyperplane arrangements*, AMS Southeastern Sectional Meeting, March 28, 2008
2. *Multiplier ideals of hyperplane arrangements*, AMS Southeastern Sectional Meeting, March 3, 2007
1. *On the intersection of the curves through a set of points in \mathbb{P}^2* , Joint Mathematics Meetings, January 8, 2007

Invited Seminar and Colloquium Presentations

41. *Waring ranks of homogeneous forms*, University of Washington, Algebra and Algebraic Geometry Seminar, November 21, 2017
40. *Waring ranks of homogeneous forms*, York University, Combinatorics Seminar, November 7, 2016
39. *Waring ranks of homogeneous forms*, Fields Institute, University of Toronto, October 18, 2016
38. *Bounds for Waring rank*, McMaster University, Algebra Seminar, September 19, 2016
37. *Bounds for Waring rank*, University of Minnesota, Commutative Algebra Seminar, February 18, 2016

36. *Bounds for Waring rank*, Central Michigan University, Colloquium, November 16, 2015
35. *Bounds for Waring rank*, University of Utah, Commutative Algebra Seminar, October 6, 2015
34. *Geometric lower and upper bounds for Waring rank*, University of Arkansas, Colloquium, January 6, 2015
33. *Ranks of polynomials*, University of Idaho, Colloquium, March 27, 2014
32. *Apolarity, Waring ranks, and direct sum decomposability of polynomials*, Queen's University, Algebraic Geometry Seminar, January 13, 2014
31. *A geometric lower bound for rank*, IMPANGA, Warsaw, Poland, January 11, 2013
30. *Direct sum decomposability and apolarity*, MIMUW Algebraic Geometry Seminar, Warsaw, Poland, January 10, 2013
29. *Ranks of polynomials*, Cleveland State and Kent State, April 20–23, 2011
28. *Ranks of polynomials and Experimentation at the Frontiers of Reality in Schubert Calculus*, Idaho State University, March 31–April 1, 2011
27. *Ranks of polynomials*, University of Utah, Commutative Algebra Seminar, May 30, 2011
26. *Experimentation at the Frontiers of Reality in Schubert Calculus*, University of Idaho, Colloquium, Feb. 3, 2011
25. *Ranks of polynomials*, University of Kentucky, Algebra Seminar, February 8, 2010
24. *Ranks of polynomials*, Rice, Algebra Seminar, February 2, 2010
23. *Counting curves through points with multiplicities*, Texas State University San Marcos, December 4, 2009
22. *Ranks of polynomials*, Pomona College, November 24, 2009
21. *Ranks of polynomials*, UC Santa Barbara, November 23, 2009
20. *Ranks of polynomials*, Sam Houston State University, November 18, 2009
19. *Introduction to multiplier ideals and an application to commutative algebra*, Notre Dame, November 13, 2009
18. *Ranks of polynomials*, UT Austin, October 13, 2009
17. *Arithmetic toric varieties*, UT Austin, October 13, 2009
16. *Introduction to multiplier ideals and an application to commutative algebra*, UT Arlington, October 9, 2009
15. *Ranks of polynomials*, Kansas U., September 22, 2009
14. *Ranks of polynomials*, UIUC, September 4, 2009
13. *Ranks of polynomials*, TCU, April 22, 2009

12. *Ranks of polynomials*, Texas Tech, April 17, 2009
11. *Ranks of polynomials*, Baylor, March 4, 2009
10. *Ranks of polynomials*, Purdue, February 25, 2009
9. *Experimentation at the Frontiers of Reality in Schubert Calculus*, Purdue, February 25, 2009
8. *Ranks of polynomials*, UT Arlington, February 13, 2009
7. *Bounding Hilbert functions of fat point schemes*, UIUC, October 14, 2008
6. *Multiplier ideals of hyperplane arrangements*, UT Austin, April 15, 2008
5. *Multiplier ideals of hyperplane arrangements*, Tulane, March 26, 2008
4. *On the intersection of the curves through a set of points in \mathbb{P}^2* , University of Nebraska, October 27, 2006
3. *On the intersection of the curves through a set of points in \mathbb{P}^2* , Tulane, September 25, 2006
2. *Multiplier ideals of line arrangements*, University of Utah, September 12, 2006
1. *Singularities in Algebraic Geometry*, Tulane, April 26, 2006