

Curriculum Vitae

BRIAN OSSERMAN

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Education/Employment:

2015 – Professor, **University of California**, Davis, CA
 2009 – 2015 Associate Professor, **University of California**, Davis, CA
 2007 – 2009 Assistant Professor, **University of California**, Davis, CA
 2004 – 2007 NSF Postdoctoral Research Fellow, **University of California**, Berkeley, CA
 2004, Spring JSPS Postdoctoral Fellow, **Res. Inst. for Math. Sci.**, Kyoto, Japan
 2004 Ph.D. **Massachusetts Institute of Technology**, Cambridge, MA, Mathematics
 1999 A.B. **Harvard University**, Cambridge, MA, Mathematics (Summa Cum Laude)

Grants and Scientific/Academic Honors:

2018 – 2023 **Simons Foundation Collaboration Grant**
 2013 – 2018 **Simons Foundation Collaboration Grant**
 2011 – 2013 **National Security Agency Mathematical Sciences Grant**
 2004 – 2007 **National Science Foundation Postdoctoral Research Fellowship**
 2004, July **Clay Mathematics Institute Liftoff Fellowship**
 2004, Spring **Japan Society for the Promotion of Science Postdoctoral Fellowship**
 1999 – 2002 **National Science Foundation Graduate Research Fellowship**

Research Interests:

Algebraic Geometry, Arithmetic Geometry

Research Publications:

- 2004 Limit linear series in positive characteristic and Frobenius-unstable vector bundles on curves. PhD thesis, MIT.
- 2003 1. The number of linear series on curves with given ramification, *International Mathematics Research Notices* **2003**, no. 47, 2513–2527.
- 2004 2. Linear series over real and p -adic fields. *Proceedings of the AMS* **134** (2006), no. 2, 989–993.
- 2004 3. Mochizuki’s crys-stable bundles: a lexicon and applications. *Publications of RIMS* **43** (2007), 95–119.
- 2004 4. Mochizuki’s indigenous bundles and Ehrhart polynomials, with Fu Liu. *Journal of Algebraic Combinatorics* **23** (2006), no. 2, 125–136.
- 2004 5. Rational functions with given ramification in characteristic p . *Compositio Mathematica* **142** (2006), no. 6, 433–450.
- 2004 6. A limit linear series moduli scheme. *Annales de l’Institut Fourier* **56** (2006), no. 4, 1165–1205.
- 2004 7. Logarithmic connections with vanishing p -curvature. *Journal of Pure and Applied Algebra* **213** (2009), no. 9, 1651–1664.

- 2004 8. Frobenius-unstable bundles and p -curvature. *Transactions of the AMS* **360** (2008), no. 1, 273–305.
- 2004 9. The generalized Verschiebung for curves of genus 2. *Mathematische Annalen* **336** (2006), no. 4, 963–986.
- 2004 10. Deformations of covers, Brill-Noether theory, and wild ramification. *Mathematical Research Letters* **12** (2005), no. 4, 483–491.
- 2006 11. Flatness of the linked Grassmannian, with David Helm. *Proceedings of the AMS* **136** (2008), no. 10, 3383–3390.
- 2006 12. Linked Grassmannians and crude limit linear series. *International Mathematics Research Notices* **2006**, No. 25, Article ID 25782, 1–27.
- 2006 13. Linear series and existence of branched covers. *Compositio Mathematica* **144** (2008), no. 1, 89–106.
- 2006 14. The irreducibility of certain pure-cycle Hurwitz spaces, with Fu Liu. *American Journal of Mathematics* **130** (2008), no. 6, 1687–1708.
- 2008 15. Deformations and automorphisms: a framework for globalizing local tangent and obstruction spaces. *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze* **IX** (2010), no. 3, 581–633.
- 2008 16. Functorial reconstruction theorems for stacks, with Max Lieblich. *Journal of Algebra* **322** (2009), no. 10, 3499–3541.
- 2009 17. Some 4-point Hurwitz numbers in positive characteristic, with Irene Bouw. *Transactions of the AMS* **363** (2011), no. 12, 6685–6711.
- 2010 18. Brill-Noether loci with fixed determinant in rank 2. *International Journal of Mathematics* **24** (2013), no. 13, 1350099, 24 pages.
- 2010 19. Lifting tropical intersections, with Sam Payne. *Documenta Mathematica* **18** (2013), 121–175.
- 2010 20. Linked Hom spaces. *Mathematical Research Letters* **18** (2011), no. 2, 329–335.
- 2011 21. Strong nonnegativity and sums of squares on real varieties, with Mohamed Omar. *Journal of Pure and Applied Algebra* **217** (2013), no. 5, 843–850.
- 2011 22. Linked alternating forms and linked symplectic Grassmannians, with Montserrat Teixidor i Bigas. *International Mathematics Research Notices* **2014** (2014), no. 3, 720–744.
- 2011 23. Abel maps and limit linear series, with Eduardo Esteves. *Rendiconti del Circolo Matematico di Palermo* **62** (2013), no. 1, 79–95 (special issue on algebraic geometry).
- 2011 24. A simple characteristic-free proof of the Brill-Noether theorem. *Bulletin of the Brazilian Mathematical Society* **45** (2014), no. 4, 807–818 (special issue in honor of Steven Kleiman and Aron Simis).
- 2011 25. Special determinants in higher-rank Brill-Noether theory. *International Journal of Mathematics* **24** (2013), no. 11, 1350084, 20 pages.
- 2011 26. Lifting non-proper tropical intersections, with Joseph Rabinoff. *Tropical and Non-Archimedean Geometry*, Omid Amini, Matthew Baker and Xander Faber (eds), Contemporary Mathematics 605, 2013, 15–44.
- 2013 27. Relative dimension of morphisms and dimension for algebraic stacks. *Journal of Algebra* **437** (2015), 52–78.
- 2014 28. Stability of vector bundles on curves and degenerations. *Canadian Mathematical Bulletin* **59** (2016), no. 4, 858–864.

- 2014 29. Severi degrees on toric varieties, with Fu Liu. *Journal für die reine und angewandte Mathematik (Crelle's journal)* **739** (2018), 121–158.
- 2014 30. Limit linear series moduli stacks in higher rank. Preprint (62 pages).
- 2014 31. Linked symplectic forms and limit linear series in rank 2 with special determinant, with Montserrat Teixidor i Bigas. *Advances in Mathematics* **288** (2016), 576–630.
- 2014 32. Limit linear series for curves not of compact type. *Journal für die reine und angewandte Mathematik (Crelle's journal)*, to appear (30 pages).
- 2014 33. Dimension counts for limit linear series on curves not of compact type. *Mathematische Zeitschrift* **284** (2016), no. 1-2, 69–93.
- 2014 34. Linked determinantal loci and limit linear series, with John Murray. *Proceedings of the AMS* **144** (2016), no. 6, 2399–2410.
- 2017 35. Limit linear series and ranks of multiplication maps, with Fu Liu, Montserrat Teixidor i Bigas, and Naizhen Zhang. Preprint (44 pages).
- 2017 36. Connectedness of Brill-Noether loci via degenerations. *International Mathematics Research Notices*, to appear (13 pages).
- 2017 37. Limit linear series and the Amini-Baker construction. *Mathematische Zeitschrift*, to appear (32 pages).
- 2017 38. Universal limit linear series and descent of moduli spaces, with Max Lieblich. *manuscripta mathematica*, to appear (26 pages).
- 2017 39. Multigraded Cayley-Chow forms, with Matthew Trager. Preprint (20 pages).
- 2017 40. An observation on (-1) -curves on rational surfaces, with Olivia Dumitrescu. *Proceedings of the AMS*, to appear (6 pages).
- 2018 41. The Gieseker-Petri theorem and imposed ramification, with Melody Chan and Nathan Pflueger. Preprint (15 pages).
- 2018 42. On the solvability of viewing graphs, with Matthew Trager and Jean Ponce. Accepted for presentation at the *European Conference on Computer Vision*, 2018.
- 2018 43. The strong maximal rank conjecture and moduli spaces of curves, with Fu Liu, Montserrat Teixidor i Bigas, and Naizhen Zhang. Preprint (59 pages).
- 2018 44. A Riemann-Hurwitz-Plucker formula, with Adrian Zahariuc. Preprint (17 pages).

Expository Publications:

- 2005 Two degeneration techniques for maps of curves. *Snowbird Lectures in Algebraic Geometry*, 137-143, Contemporary Mathematics 388, AMS, 2005.
- 2006 The Riemann Hypothesis for elliptic curves, with Jasbir Chahal. *American Mathematical Monthly*, **115** (2008), no. 5, 431–432.
- 2007 The Weil conjectures, in *Princeton Companion to Mathematics*.

Selected Lectures:

- 2018 Apr. **Portland AMS Special Session, Moduli Spaces:** Moduli spaces of linear series and nodal curves
- 2017 Apr. **Berkeley Commutative Algebra and Algebraic Geometry Seminar:** Generalized Cayley-Chow coordinates and computer vision
- Mar. **Harvard-MIT Algebraic Geometry Seminar:** Limit linear series and the maximal rank conjecture

- 2016 Apr. **Stonybrook Algebraic Geometry Seminar:** Linear series on curves and their degenerations
- Mar. **Conference on Equivariant Geometry and Algebraic Stacks (Kioloa, Australia):** Relative dimension for stacks
- 2015 Oct. **Western Algebraic Geometry Symposium (University of Washington):** Limit linear series: progress and generalizations
- Feb. **Warwick Concentration Period on Moduli Spaces and Derived Categories:** Higher-rank Brill-Noether theory and special determinants
- 2014 Oct. **San Francisco AMS Special Session, Combinatorics and Algebraic Geometry:** Recent progress on limit linear series
- Mar. **Banff Workshop on Specialization of Linear Series for Algebraic and Tropical Curves:** Some problems relating to linear series on curves
- Mar. **Utah Algebraic Geometry Seminar:** Recent progress on vector bundles with sections
- 2013 Sept. **Berkeley Commutative Algebra and Algebraic Geometry Seminar:** Counting curves on toric surfaces
- Sept. **Yale Algebraic and Tropical Geometry Seminar:** New perspectives on limit linear series
- Aug. **SIAM Conference on Applied Algebraic Geometry (Fort Collins), Session on Number Theory and Curves:** Degenerations and non-algebraically-closed fields
- Jul. **School on Algebraic Geometry (Morelia, Mexico):** Lecture series: Degeneration techniques for linear series on curves
- Apr. **Colorado Kempner Colloquium:** Revisiting relative dimension of maps of varieties
- Mar. **Berkeley Representation Theory, Combinatorics, and Geometry Seminar:** Images and degenerations of projective spaces
- 2012 Apr. **University of Washington Algebra and Algebraic Geometry Seminar:** Generalized determinantal loci and a new perspective on limit linear series
- 2011 Apr. **Newton Institute seminar:** Special determinants in higher-rank Brill-Noether theory
- 2010 Nov. **IMPA lecture series:** Limit linear series: constructions and applications
- 2009 Dec. **MSRI Tropical Colloquium:** Lifting tropical intersections
- Oct. **Western Algebraic Geometry Seminar (UCLA):** Vector bundles with sections
- Apr. **Princeton Algebraic Geometry Seminar:** Vector bundles with sections
- 2008 Aug. **Oberwolfach (Germany) workshop, Arithmetic Algebraic Geometry:** Tamely branched covers and degenerations
- 2007 Jul. **UPenn Algebra Seminar:** Connectedness of certain Hurwitz spaces
- 2006 Oct. **University of Michigan Algebraic Geometry Seminar:** Of functors and stacks
- Apr. **Columbia Algebraic Geometry Seminar:** Beyond Schlessinger: deformation stacks
- Apr. **Durham AMS Special Session, Galois Groups in Arithmetic and Geometry:** Progress on Riemann existence via degenerations
- Feb. **Bellingham Algebraic Geometry Seminar:** Limit linear series: an overview
- 2005 Sep. **Berkeley Representation Theory, Combinatorics, and Geometry Seminar:** Identities of Ehrhart polynomials arising from algebraic geometry

- 2004 Dec. **Orsay Seminar on Arithmetic and Algebraic Geometry:** Tamely ramified covers of the projective line
- Oct. **Evanston AMS Special Session, Modern Schubert Calculus:** Transversality of non-general Schubert cycles
- Oct. **Brown Algebraic Geometry Seminar:** Elementary applications of a technical theorem
- Jul. **Snowbird JSRC, Algebraic Geometry: Presentations by Young Researchers:** Two degeneration techniques for maps of curves
- Apr. **Kyoto University Algebraic Geometry Seminar:** Frobenius-unstable vector bundles and the generalized Verschiebung
- Jan. **MSRI, Program on Topological Aspects of Real Algebraic Geometry:** Real linear series on curves
- 2003 Dec. **Harvard-MIT Algebraic Geometry Seminar:** Limit linear series: simple cases in positive characteristic

Teaching:

At the University of California, Davis:

- 2017 Fall **Math 248A: Graduate algebraic geometry**
 Fall **Math 21M: Accelerated calculus**
 Spring **Math 280: Graduate topics course: algebraic curves and degenerations**
- 2016 Fall **Math 21M: Accelerated calculus**
 Winter **Math 248B: Graduate algebraic geometry**
- 2015 Fall **Math 248A: Graduate algebraic geometry**
 Fall **Math 21A: Introductory calculus**
 Spring **Math 150C: Algebra**
- 2014 Fall **Math 115A: Number theory**
 Winter **Math 248B: Graduate algebraic geometry**
- 2013 Fall **Math 248A: Graduate algebraic geometry**
 Fall **Math 21A: Introductory calculus**
 Winter **Math 280: Graduate topics course: algebraic curves and degenerations**
 Winter **Math 150B: Algebra**
- 2012 Fall **Math 21A: Introductory calculus**
 Winter **Math 248B: Graduate algebraic geometry**
- 2011 Winter **Math 250B: Graduate algebra**
 Winter **Math 16B: Short calculus**
- 2010 Winter **Math 248B: Graduate algebraic geometry**
- 2009 Fall **Math 248A: Graduate algebraic geometry**
 Fall **Math 21B: Introductory calculus**
- 2008 Fall **Math 240A: Graduate differential geometry**
 Fall **Math 21C: Introductory calculus**
 Summer **Math 167: Undergraduate applied linear algebra**
 Spring **Math 250C: Graduate algebra**

2007 Fall **Math 21A: Introductory calculus**

At the University of California, Berkeley:

2007 Spring **Math 256B: Graduate algebraic geometry**

2006 Fall **Math 256A: Graduate algebraic geometry**

Spring **Math H113: Honors undergraduate abstract algebra**

2005 Fall **Math 254A: Graduate number theory**

Professional Activities:

Journals refereed: Advances in Mathematics, Algebra and Number Theory, Algebraic Geometry, American Mathematical Monthly, Annales de l'Institut Fourier, Annals of Mathematics, Bulletin des Sciences Mathematiques, Canadian Mathematical Bulletin, Central European Journal of Mathematics, Commentari Mathematici Helvetici, Communications in Algebra, Compositio Mathematica, Crelle's Journal, Duke Mathematical Journal, Epijournal de Geometrie Algebrique, Geometriae Dedicata, International Journal of Mathematics, International Mathematics Research Notices, Journal of Algebraic Combinatorics, Journal of Combinatorial Theory, Series A, Journal of Pure and Applied Algebra, Journal of Transformation Groups, Kodai Mathematical Journal, manuscripta mathematica, Mathematical Proceedings of the Cambridge Philosophical Society, Mathematical Research Letters, Mathematische Nachrichten, Mathematische Zeitschrift, Proceedings of the AMS, Proceedings of the LMS, Revista Matematica Complutense, Transactions of the AMS.

2015 Aug. (Co)Organizer of AIM workshop **Degenerations in Algebraic Geometry** at AIM, San Jose, CA.

Feb. Organizer of **Western Algebraic Geometry Symposium** at the University of California, Davis.

2007 Jul. (Co)Organizer of summer graduate workshop **Deformation Theory in Algebraic Geometry** at MSRI, Berkeley, CA.

2006 Mar. (Co)Organizer of **Western Algebraic Geometry Seminar** at the University of California, Berkeley.

Mentoring activities:

PhD Students:

2016– John Challenor: positive characteristic phenomena in linear series

2014–2018 Xiang He: connections between tropical and algebraic geometry

2014–2018 Wen Liu: limit linear series for curves not of compact type

2010–2014 Binglin Li: limit linear series and fibers of Abel maps

2010–2014 Naizhen Zhang: higher-rank Brill-Noether theory and degenerations

Postdoctoral mentees:

2016–2019 Adrian Zahariuc

2010–2013 Olivia Dumitrescu