David Stapleton

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Employment

2021-2024 Postdoc, University of Michigan. Mentor: Alexander Perry.

2017-2021 Postdoc, UC San Diego. Mentor: James McKernan.

Education

2013–2017 **Ph.D., Mathematics**, *Stony Brook University*, Stony Brook, NY.
Advisor: Robert Lazarsfeld. Graduated: Aug. 19, 2017.

2011–2013 **M.S., Mathematics**, *University of Michigan*, Ann Arbor, MI.

2007–2011 **B.S., Mathematics; B.S., Physics**, *Wheaton College*, Wheaton, IL.

Publications

14. *Complexes of stable birational invariants,* with James Hotchkiss, (2023). In preparation.
13. *The fibering genus of Fano hypersurfaces,* with Nathan Chen, Benjamin Church, and Lena Ji. arxiv:2308.12401, (2023). Submitted.
12. *The minimal fibering degree of a toric variety equals the lattice width of its polytope,* with Audric Lebovitz. arxiv:2308.04421, (2023). Submitted.
11. *Minimal degree fibrations in curves and the asymptotic degree of irrationality of divisors,* with Jake Levinson and Brooke Ullery. arxiv:2304.09963, (2023). Submitted.
10. *Smooth limits of plane curves of prime degree and Markov numbers*, with Kristin DeVleming. arxiv:2208.10595, (2022). Submitted.
9. *Fano hypersurfaces with no finite order birational automorphisms*, with Nathan Chen and Lena Ji. arxiv:2208.07396, (2022). Submitted.
8. *Higher index Fano varieties with finitely many birational automorphisms*, with Nathan Chen. (2022) Compositio Mathematica, 158(11), 2033-2045.
7. *Rational endomorphisms of Fano hypersurfaces*, with Nathan Chen. arxiv:2103.12207, (2021). Submitted.
6. *A direct proof that toric rank 2 bundles on projective space split*. Mathematica Scandinavica. 126, 3 (2020), 493-496.
5. *Maximal Chow constant and cohomologically constant fibrations*, with Kristin DeVleming. Commun. in Contemporary Math. (2020).
4. *Fano hypersurfaces with arbitrarily large degrees of irrationality*, with Nathan Chen. Forum of Mathematics, Sigma. 8 e24 (2020).
3. *The degree of irrationality of hypersurfaces in various Fano varieties*, with Brooke Ullery. Manuscripta Mathematica. 161 (2020), 377-408.

The degree of irrationality of very general hypersurfaces in some homogeneous spaces, Ph.D. thesis (2017). Stony Brook University.

2. *The tangent space of the punctual Hilbert scheme*, with Dori Bejleri. Michigan Math. J. 66 (2017), no. 3, 595-610.
1. *Geometry and stability of tautological bundles on Hilbert schemes of points*. Algebra and Number Theory. 10, 6 (2016), 1173-1190.

Expository writing

Exercises in *Hyperkahler manifolds* with Samir Canning, Yajnasetti Dutta, and Elham Izadi. Rend. Istit. Mat. Univ. Trieste. 54 (2022), 163-206.

Funding

2022 **SCGP Workshop**, *Birational Complexity of Algebraic Varieties*, $50,000.

2018–2021 **AMS-Simons Travel Grant**, $4000.

Organizational Activities

Dec. 2022 **Organizer:** *Birational Complexity of Algebraic Varieties* (workshop), SCGP.

Dec. 2022 **Organizer:** *Graduate Workshop on Birational Complexity*, SCGP.

2020-2021 **Organizer:** *UCSD Algebraic Geometry Seminar*, UCSD.

2018-2019 **Organizer:** *Old News in Algebraic Geometry Seminar*, UCSD.

2016-2017 **Organizer:** *RTG Student Geometry Seminar*, Stony Brook.

2016-2017 **Founder & President:** *AMS Graduate Student Chapter*, Stony Brook.

2014-2016 **Organizer:** *Student Algebraic Geometry Seminar*, Stony Brook. Toric varieties (S2016), Rational Curves (F2015), K3 Surfaces (S2015), Arithmetic of Elliptic Curves (F2015).

Refereeing work

Advances in Math., Algebra and Number Theory, Communications in Algebra, Crelle's Journal, European Journal of Math., IMRN, J. Math. Pures Appl., JPAA, Math. Z., MRL.

Invited Talks

Oct. 2023 **Fields Medal Symposium in honor of Caucher Birkar:** The Fields Institute.

Sep. 2023 **Arkansas Algebra Seminar:** University of Arkansas.

Jun. 2023 **Thematic Program on Rationality and Hyperbolicity:** *Birational Geometry of complex Fano hypersurfaces via characteristic p*, Notre Dame.

Mar. 2023 **Kentucky Algebra Seminar:** *Smooth limits of plane curves and Markov numbers*, University of Kentucky.

Jan. 2023 **Zoom Birational Geometry Seminar:** *Higher index Fano varieties with finitely many birational automorphisms*.

Dec. 2022 **Birational Complexity of Algebraic Varieties:** *Minimal degree fibrations and the asymptotic degree of irrationality of divisors*, SCGP.

Nov. 2022 **Penn State Algebra and Number Theory Seminar:** *Smooth limits of plane curves and Markov numbers*, Penn State University.

Oct. 2022 **Emory Algebra and Number Theory Seminar:** *Smooth limits of plane curves and Markov numbers*, Emory University.

May 2022 **KU Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, Kansas University.

Apr. 2022 **Michigan State Algebra Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, Michigan State University.

Mar. 2022 **Northwestern Algebraic Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, Northwestern University.

Feb. 2022 **Higher Dimensional Geometry:** *Mori's Conjecture, Plane Curves, and Markov Numbers*, Simons Foundation.

Jan. 2022 **UGA Algebraic Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, University of Georgia.

Dec. 2021 **WashU Colloquium:** *How complicated could a Fano hypersurface really be*, Washington University St. Louis.

Nov. 2021 **Hannover Algebraic Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, Hannover.

Oct. 2021 **Valley Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, UMass Amherst.

Sep. 2021 **Michigan Algebraic Geometry Seminar:** *Studying the birational geometry of Fano varieties using holomorphic forms*, University of Michigan.

Feb. 2021 **Kentucky Algebra Seminar:** *Studying Fano hypersurfaces with holomorphic forms*, University of Kentucky.

Feb. 2021 **Derived Seminar:** *Studying Fano hypersurfaces with holomorphic forms*.

Nov. 2020 **UCSD Undergraduate Colloquium:** *The geometry of projective space*, UCSD.

Oct. 2020 **UIC Algebraic Geometry Seminar:** *Irrationality of Fano hypersurfaces*, UIC.

Jun. 2020 **UC Santa Barbara Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UC Riverside.

Feb. 2020 **Southern California Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UCSD.

Jan. 2020 **McMaster Colloquium:** *Hypersurfaces which are far from being rational*, McMaster University.

Nov. 2019 **UC Riverside Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UC Riverside.

Dec. 2018 **UC Davis Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, UC Davis.

Oct. 2018 **AMS Sectional Meeting:** *The degree of irrationality of hypersurfaces in various Fano varieties*, San Francisco State.

Oct. 2018 **UCLA Algebra Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, UCLA.

Dec. 2017 **Utah Algebraic Geometry Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, University of Utah.

Nov. 2017 **Georgia Algebraic Geometry Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, UGA.

Oct. 2017 **UCSD RTG Colloquium:** *Measures of Irrationality of Algebraic Varieties*, UC San Diego.

Oct. 2017 **UCSD Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, UC San Diego.

Sep. 2017 **Vector Bundles on Algebraic Curves (VBAC) Conference:** *Tautological bundles on Hilbert schemes of points*, Essen, Germany.

Mar. 2017 **Harvard-MIT Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, Harvard.

Nov. 2016 **Wisconsin Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, University of Wisconsin.

Nov. 2016 **Stony Brook Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, Stony Brook University.

Apr. 2016 **AMS Graduate Student Conference:** *Hilbert schemes of points and their tautological bundles*, Brown University.

Participation in Special Programs

Jan. 2023 **ICERM Collaboration,** ICERM.

Spring 2019 **Birational Geometry and Moduli Spaces,** MSRI.

May 2018 **Birational Geometry and Arithmetic,** ICERM.

Oct. 2016 **Rational subvarieties in positive characteristic,** AIM Workshop.

Aug. 2016 **Positivity of Cycles,** AIM Workshop.

Teaching

Fall 2023 **Modern Algebra**, Math 412, University of Michigan.

Spring 2023 **Linear Algebra**, Math 217, University of Michigan.

Winter 2023 **Theory of Algorithms**, Math 416, University of Michigan.

Fall 2022 **Linear Algebra**, Math 217, University of Michigan.

Spring 2022 **Algebraic Geometry II**, Math 632, University of Michigan.

Fall 2021 **Calculus I**, Math 115, University of Michigan.

Spring 2021 **Calculus and Analytic Geometry**, Math 20C, UC San Diego.

Winter 2020 **Calculus and Analytic Geometry**, Math 20C, UC San Diego.

Winter 2020 **Vector Calculus**, Math 20E, UC San Diego.

Fall 2019 **Calculus and Analytic Geometry**, Math 20C, UC San Diego.

Summer 2019 **Modern Algebra 2**, Math 103B, UC San Diego.

Fall 2018 **Calculus 2 for Science and Engineering**, Math 20B, UC San Diego.

Winter 2018 **Modern Algebra**, Math 103A, UC San Diego.

Fall 2017 **Abstract Algebra**, Math 100A, UC San Diego.

Spring 2013 **Calculus II**, Math 116, University of Michigan.

Fall 2012 **Calculus II**, Math 116, University of Michigan.

Spring 2012 **Calculus I**, Math 115, University of Michigan.

Fall 2011 **Calculus I**, Math 115, University of Michigan.