David Stapleton

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Research Interests

Algebraic Geometry: measures of irrationality, cycles and Chow groups, Hilbert schemes of points, vector bundles, and positivity.

Employment

2017-2020 Postdoc, UC San Diego. Mentor: James McKernan.

Education

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

○ *Rational endomorphisms of Fano hypersurfaces*, with Nathan Chen. arxiv:2001.11075. submitted.

○ *A direct proof that toric rank 2 bundles on projective space split.* Mathematica Scandinavica. 126, 3 (2020), 493-496.

○ *Maximal Chow constant and cohomologically constant fibrations*, with Kristin DeVleming. arXiv:1909.01483. accepted Commun. in Contemporary Math. (2020).

○ *Fano hypersurfaces with arbitrarily large degrees of irrationality*, with Nathan Chen. Forum of Mathematics, Sigma. 8 e24 (2020).

○ *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.

○ *The tangent space of the punctual Hilbert scheme*, with Dori Bejleri. Michigan Math. J. 66 (2017), no. 3, 595-610.

○ *Geometry and stability of tautological bundles on Hilbert schemes of points.* Algebra and Number Theory. 10, 6 (2016), 1173-1190.

Grants

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

Organizational Activities

- **co-Organizer:** *UCSD Alg. Geometry Seminar* (virtual), UCSD. 2020-2021.
- **co-Organizer:** *Old News in Algebraic Geometry Seminar*, UCSD. 2018-2019.
- **co-Organizer:** *RTG Student Geometry Seminar*, Stony Brook. 2016-2017.
- **Founder & President:** *AMS Graduate Student Chapter of the AMS*, Stony Brook. 2016-2017.
- **Organizer:** *Secret equivariant K-theory seminar*, Stony Brook. Spring 2016.
- **Organizer:** *Student Algebraic Geometry Seminar*, Stony Brook. 2014-2016. Topics: Toric varieties (Spring 2016), Rational Curves (Fall 2015), K3 Surfaces (Spring 2015), Arithmetic of Elliptic Curves (Fall 2015).
- **Organizer:** *Secret Summer Abelian Varieties Seminar*, Stony Brook. 2014.
- **co-Organizer:** *Secret Stacks Seminar*, Stony Brook. 2013.

Refereeing

- Comm. Algebra, EJM, IMRN, J. Math. Pures Appl., MRL.

Invited Talks

- **Kentucky Algebra Seminar:** *Studying Fano hypersurfaces with holomorphic forms*, University of Kentucky. February 2021.
- **Derived Seminar:** *Studying Fano hypersurfaces with holomorphic forms* (virtual). February 2021.
- **UCSD Undergraduate Colloquium:** *The geometry of projective space*, UCSD. November 2020.
- **UIC Algebraic Geometry Seminar:** *Irrationality of Fano hypersurfaces*, UIC. October 2020.
- **UC Santa Barbara Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UC Riverside. June 2020.
- **Miami Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, University of Miami. April 2020. (cancelled)
- **Northwestern University Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, Northwestern. April 2020. (cancelled)
- **Southern California Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UCSD. February 2020.
- **UC Riverside Algebraic Geometry Seminar:** *Fano hypersurfaces with large degrees of irrationality*, UC Riverside. November 2019.
- **UC Davis Algebraic Geometry Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, UC Davis. December 2018.
- **AMS Sectional Meeting:** *The degree of irrationality of hypersurfaces in various Fano varieties*, San Francisco State. October 2018.
- **UCLA Algebra Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, UCLA. October 2018.

- **Utah Algebraic Geometry Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, University of Utah. December 2017.
- **Georgia Algebraic Geometry Seminar:** *The degree of irrationality of hypersurfaces in various Fano varieties*, UGA. November 2017.
- **UCSD RTG Colloquium:** *Measures of Irrationality of Algebraic Varieties*, UC San Diego. October 2017.
- **UCSD Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, UC San Diego. October 2017.
- **Vector Bundles on Algebraic Curves (VBAC) Conference:** *Tautological bundles on Hilbert schemes of points*, Essen, Germany. September 2017.
- **Harvard-MIT Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, Harvard. March 2017.
- **Wisconsin Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, University of Wisconsin. November 2016.
- **Stony Brook Algebraic Geometry Seminar:** *Tautological bundles on Hilbert schemes of points*, Stony Brook University. November 2016.
- **AMS Graduate Student Conference:** *Hilbert schemes of points and their tautological bundles*, Brown University. April 2016.

Participation in Special Programs

Spring 2019	**Birational Geometry and Moduli Spaces,** MSRI.
May 2018	**Birational Geometry and Arithmetic,** ICERM.
October 2016	**Rational subvarieties in positive characteristic,** AIM Workshop.
August 2016	**Positivity of Cycles,** AIM Workshop.

Teaching

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.
Fall 2015	**Calculus with Applications (TA)**, 2 sections, Stony Brook University.
Fall 2014	**Calculus I (TA)**, 2 sections, Stony Brook University.
Fall 2013	**Calculus I (TA)**, Stony Brook University.
Fall 2013	**Differential Equations with Applications (TA)**, Stony Brook University.
Spring 2013	**Calculus II**, University of Michigan.
Fall 2012	**Calculus II**, University of Michigan.

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

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