

Steffen Marcus

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Academic Positions

Assistant Professor, The College of New Jersey, 2014 - present.

Burgess Assistant Professor/Lecturer, University of Utah, 2011 - 2014.

Education

Ph.D. Mathematics, Brown University, 2011.

National Science and Engineering Research Council of Canada Post-Graduate Scholarship
Dissertation: Spaces of Stable Maps, Evaluation Spaces, and Polynomial Families of Tautological Classes

Advisor: Dan Abramovich

M.A. Mathematics, Brown University, 2008.

B. Arts Sc. (Honours), McMaster University, 2006, *Summa Cum Laude*.

Thesis: Topology and Model Theory

Advisors: Dierdre Haskell, Hans U. Boden

Research Interests

Algebraic Geometry, Mathematical Physics, and Algebraic Combinatorics:

Moduli Theory, Virtual Enumerative Geometry, Mirror Symmetry, Birational Geometry of Moduli Spaces, Logarithmic Geometry, Tropical Geometry, Hurwitz Theory

Research Papers

Publications

1. *Skeletons and fans of logarithmic structures*, with Dan Abramovich, Qile Chen, Martin Ulirsch and Jonathan Wise, proceedings of the Simons Foundation Symposium “Nonarchimedean and Tropical Geometry”, to appear (accepted July 2015).
2. *Boundedness of the space of stable logarithmic maps*, with Dan Abramovich, Qile Chen and Jonathan Wise, Journal of the European Mathematical Society, to appear (accepted June 2015).

3. *The Stability Manifold of \mathbb{P}^1 and local \mathbb{P}^1* , with Aaron Bertram and Jie Wang, Hodge Theory and Classical Algebraic Geometry (Contemporary Mathematics/AMS), **647** (2015) pp. 1-17.
4. *Doing Algebraic Geometry with the RegularChains Library*, with Parisa Alvandi, Changbo Chen, Marc Moreno Maza, Éric Schost and Paul Vrbik, Proceedings of ICMS 2014 – 4th International Congress, Seoul, South Korea, Lecture Notes in Computer Science **8592** (2014) pp. 472-479
5. *A geometric perspective on the piecewise polynomiality of double Hurwitz numbers*, with Renzo Cavalieri, Canadian Mathematical Bulletin **57**, (2014) pp. 749-764.
6. *Comparison theorems for Gromov-Witten invariants of smooth pairs and of degenerations*, with Dan Abramovich and Jonathan Wise, Annales de L'institute Fourier **64** no. 4, (2014) pp. 1611-1667.
7. *On Fulton's algorithm for computing intersection multiplicities*, with Marc Moreno Maza and Paul Vrbik, Computer Algebra in Scientific Computing (Proceedings), (2012) pp. 198-211.
8. *Polynomial families of tautological classes on $\mathcal{M}_{g,n}^{rt}$* , with Renzo Cavalieri and Jonathan Wise, Journal of Pure and Applied Algebra **216** (2012) pp. 950-981.
9. *Very twisted stable maps*, with Qile Chen and Henning Úlfarsson, Communications in Analysis and Geometry **18** (2010) pp. 831-855.

Preprints

10. *Stable maps to semistable rational curves and the relative Jacobian*, with Jonathan Wise, preprint.
11. *The evaluation space of logarithmic stable maps*, with Dan Abramovich, Qile Chen and William Gillam, preprint.

Invited Talks

Lecture Series, Conference, and Workshop talks

Logarithmic Gromov-Witten theory

Summer School on Mirror Symmetry and Gromov-Witten Theory, June 2013, TIMS, Taipei.

Logarithmic Gromov-Witten invariants

2013 MIT-RTG Mirror Symmetry Workshop, Big Bear Lake, CA, May 2013.

Comparison of virtual cycles.

Virtual Cycle Workshop, University of Michigan, March 2013.

Computation and comparison of Jacobian and Hurwitz classes on the moduli space of curves

AMS Special Session on Algebraic Geometry, University of Colorado Boulder, April 2013.

AIM Workshop on Integrable systems in GW and SFT, January 2012.

A comparison theorem for relative Gromov-Witten theories

AMS Special Session on Algebraic Geometry, University of Hawaii at Manoa, March 2012.

Polynomial families of tautological classes on the moduli space of curves

Géométrie Algébrique en Liberté XIX, Berlin, July 2011.

Alberta Topology Seminar, University of Calgary, June 2011.

AMS Special Session on Birational Geometry and Moduli, AMS Joint Meetings, January 2011.

AMS MRC: Birational Geometry and Moduli Spaces, Snowbird Resort, Utah, June 2010.

Seminar Talks

Strings, Curves, Maps, and Monoids: Mixing Ideas from Physics and Combinatorics to Study Problems in Algebraic Geometry

School of Science Colloquium, The College of New Jersey, Spring 2016

A geometric perspective on the piecewise polynomiality of double Hurwitz numbers

Algebraic Geometry Seminar, University of Utah, Fall 2013.

RTGC Seminar, UC Berkeley, Fall 2013

Algebraic Geometry Seminar, UGA, Fall 2014

Logarithmic stable maps, evaluation spaces, and boundedness

FRAGMENT Seminar, CSU/UCB/UW, Fall 2013.

Intersection multiplicities via regular chains

NAGlab Seminar, Colorado State University, Fall 2013.

Computation and comparison of Jacobian and Hurwitz classes on the moduli space of curves

Geometry & Topology Seminar, University of Michigan, Spring 2013.

Special Seminar, Reykjavik University, Fall 2012

Algebraic Geometry Seminar, University of Utah, Fall 2011.

Polynomial families of tautological classes on the moduli space of curves

Algebraic Geometry Seminar, Harvard/MIT, Spring 2011.

Algebraic Geometry Seminar, University of Utah, Fall 2010.

Very twisted stable maps

Graduate Student Seminar, MSRI, Spring 2009.

FRAGMENT Seminar, CSU/UCB, Fall 2009.

Algebraic Geometry Seminar, Brown University, Fall 2008.

A geometric perspective on the piecewise polynomiality of double Hurwitz numbers

Department Colloquium, The College of New Jersey, Fall 2014

A few of my favourite things

Graduate Colloquium, University of Utah, Fall 2011

Deforming geometry: moduli spaces in action

Undergraduate Colloquium, University of Utah, Fall 2012

Awards and Professional Development

NJ NExT fellow, 2014-2015

University of Utah Outstanding Postdoc Award, 2011 – 2012.

Brown UCS Outstanding Graduate TA/TF Award, 2009 – 2010.

Brown Mathematics Department Teaching Award, 2010 – 2011.

Sheridan Center Consultant and Faculty Liaison, 2009 – 2011;

Service

Committee Member and Reader: Sam Molcho, PhD, Brown University, April 2014

Supervisor, undergraduate student reading courses:

Algebraic geometry and curves, Alana Huszar, Spring 2015

Elliptic curves, Ryan Wilson, Spring 2015

Supervisor, graduate student reading courses:

Varieties and examples, various students, Spring 2013.

Hartshorne Chapter 1, Miles Fore, Summer 2013.

Algebraic Geometry, Jonathan Watson, Fall 2013.

Supervisor, REU research project:

Drew Ellingson, *Top intersections on the moduli space of curves*, Summer & Fall 2013.

Organizer, Algebraic Geometry Seminar, University of Utah, Spring 2011 – Spring 2013.

Director, Summer Mathematics Program for High School Students, University of Utah, June 2013 and June 2014.

Facilitator, Utah Teachers' Circle

Summer Training Program, July 2012 and July 2013.

Various weekly meetings throughout 2012, 2013 and 2014.

Organizer, Western Algebraic Geometry Symposium poster session, Fall 2012.

Referee for *International Mathematics Research Notices* and *Journal of Algebraic Combinatorics*.