Morgan Brown

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Research Interests:

Birational Geometry, Berkovich Spaces, Cox Rings

Employment:

2015-present	Assistant Professor, University of Miami
Spring 2016	Visiting Research Scholar, UCSD
2012-2015	Post-Doc RTG Assistant Professor, University of Michigan

Education:

2012	Ph.D	Mathematics, University of California, Berkeley. Thesis advisor: David Eisenbud.
2007	B.S.	Mathematics and Physics, magna cum laude, Duke University.

Research Papers:

1. "The Dual Complex of a semi-log canonical Surface" Arxiv:1908.04315. Submitted.

2. "The Essential Skeleton of a product of Degenerations" with Enrica Mazzon. *Compos. Math.* 155 (2019), no. 7, 1259–1300.

3. "Rational Connectivity and Analytic Contractibility." with Tyler Foster. *J. Reine Angew. Math.* 747 (2019), 45–62.

4. "A Geometric Characterization of Toric Varieties." with James McKernan, Roberto Svaldi, and Runhong Zong. *Duke Math J.* Volume 167, Number 5 (2018) 923-968.

5. "Asymptotic chip-firing groups of iterated cones" with Jackson S. Morrow and David Zureick-Brown. *Linear Algebra and its Applications.* Volume 556, (2018) 46-54.

6. "The McKay correspondence, tilting equivalences, and rationality." with Ian Shipman. *Michigan Math. J.* 66 (2017), no. 4, 785–811. doi:10.1307/mmj/1501034511. https://projecteuclid.org/euclid.mmj/1501034511.

7. "Singularities of Cox Rings of Fano Varieties." *Journal de Mathématiques Pures et Appliquées.* (9) 99 (2013), no. 6, 655–667.

8. "Big q-ample Line Bundles." *Compositio Mathematica*, Volume 148, Issue 03. (2012), pp 790-798 doi:https://doi.org/10.1112/S0010437X11007457.

9. "Properties of the Bennett Mechanism Derived From the RRRS Closure Ellipse." with Paul Milenkovic. in *ASME Journal of Mechanisms and Robotics* 3 p 021012-1-8. (2011) doi:http://dx.doi.org/10.1115/1.4003844.

10. "Trivial Selmer groups and even partitions of a graph." with Neil J. Calkin, Kevin James, Adam J. King, Shannon Lockard, and Robert C. Rhoades. *Integers* 6 (2006), A33, 17 pp.

Expository Papers:

1. "Dual Complexes and Degenerations of Canonically Polarized Surfaces." Expository paper. Submitted. Preprint available on request.
2. "Log Regular models for products of Degenerations." with Enrica Mazzon. Expository paper. *Arc schemes and singularities*, World Scientific. Apr 2020, pp 257–278.

Honors and Awards:

2011	Recipient of a Graduate School Summer Grant, UC Berkeley.
2012	Recipient of the Ken Ribet and Lisa Goldberg Thesis Prize in Algebra, UC Berkeley.
2015	Received an AMS-Simons Travel Grant.
2017	Received a Simons Foundation Collaboration Grant for Mathematicians number 524003, award amount $42000.

Seminars Organized:

Fall 2013	Michigan Postdoc Algebraic Geometry Seminar organizer
Fall 2009-Fall 2010	Berkeley Student Algebraic Geometry Seminar co-organizer
Spring and Fall 2008	Berkeley 'Many Cheerful Facts' Seminar co-organizer

Seminar Talks:

Oct 10, 2019	'The Skeleton of a Product of Degenerations', Florida State University Algebra Seminar.
May 7, 2019	'Toric Varieties', Santa Clara University Math-CS Colloquium.
Apr 9, 2019	'The Skeleton of a Product of Degenerations', Birational Geometry, Kaehler-Einstein metrics and degenerations, Moscow.
Dec 3, 2018	'Dual complexes and semi-log canonical surfaces', Algebraic Geometry in Mexico, Puerto Escondido, Mexico.
September 9, 2018	'Integral Affine structures in non-Archemedian Geometry'. University of Miami Geometry Seminar.
June 8, 2018	'The Skeleton of a Product of Degenerations', UCSD Algebraic Geometry Seminar.
May 3, 2018	'The Skeleton of a Product of Degenerations' Algebraic Geometry Seminar, University of Texas, Austin.
Apr 19, 2018	'The Dual Complex of a Semi-log canonical surface' University of Miami Geometry Seminar.
Mar 13, 2018	'The Skeleton of a Product of Degenerations', FRAGMENT Seminar, University of Colorado, Boulder.
Feb 16, 2018	'The Skeleton of a Product of Degenerations', Geometry and Topology Seminar, Imperial College London, UK.
Nov 29, 2017	'The Skeleton of a Product of Degenerations', Algebraic Geometry in Mexico, Oaxaca, Mexico.
Aug 30, 2017	'The Dual Complex of a Product of Degenerations', University of Miami Geometry Seminar.
Jun 2, 2017	'Points on del Pezzo surfaces in mixed characteristic', UCSD Algebraic Geometry Seminar.

May 15, 2017 'Characterization of toric log Calabi-Yau pairs' Advances in Birational Geometry-Closing Workshop. Erwin Schrödinger Institute, Vienna, Austria.

May 11, 2017 'A characterization of Toric Pairs' Algebraic and Arithmetic Geometry conference, UTSC, Hefei, China.

April 11, 2017 'A characterization of Toric Pairs' Emory Univeristy Algebraic Geometry Seminar.

Sept 21, 2016 'A characterization of Toric Varieties', University of Miami Geometry Seminar.

May 7, 2016 'A characterization of Toric Pairs', Tokyo-Princeton Algebraic Geometry Conference.

Apr 15, 2016 'A characterization of Toric Pairs', UCSD Algebraic Geometry Seminar.

Mar 31, 2016 'A geometric characterization of Toric Varieties', MFO workshop on Toric Varieties.

Mar 2, 2016 'Berkovich geometry and Birational geometry' UCSD RTG Colloquium.

Dec 9, 2015 'Introduction to the theory of Algebraic Curves', University of Miami Geometry Seminar.

Sept 30, 2015 'Berkovich Spaces and Birational Geometry', University of Miami Geometry Seminar.

July 17, 2015 'Homotopy Equivalence of Berkovich spaces via Birational Geometry', Contributed talk at Algebraic Geometry 2015, University of Utah.

Jun 8-15, 2015 'A mini-course on Berkovich spaces', BICMR

Mar 2, 2015 'Rational Connectivity and Analytic Contractibility', Caltech Algebraic Geometry Seminar.

Jan 15, 2015 'Rationality of Algebraic Varieties', University of Miami Colloquium.

Mar 25, 2014 'Birational geometry of cluster algebras', Michigan Postdoc Algebraic Geometry Seminar.

Mar 14, 2014 'Making a Derived Equivalence Explicit', University of California, San Diego Algebraic Geometry Seminar.

Feb 18, 2014 'Stability and the McKay correspondence', Ohio State University Algebraic Geometry Seminar.

Dec 10, 2013 'Numerical Tilting and Derived Equivalence', Princeton University Algebraic Geometry Seminar.

Nov 20, 2013 'Numerical Tilting and Derived Equivalence', Univeristy of Illinois, Chicago Algebraic Geometry Seminar.

Oct 23, 2013 'Numerical Tilting and Derived Equivalence', Emory University Algebra Seminar.

Sept 24, 2013 'Cox Rings of resolutions of surface canonical singularities', Michigan Postdoc Algebraic Geometry Seminar.

Apr 14, 2013 't-structures for the Derived McKay Correspondence', Boulder AMS Sectional Meeting.

Apr 2, 2013 'The McKay correspondence via tilting', Rice University Algebraic Geometry Seminar.

Mar 20, 2013 'The McKay correspondence', Michigan Algebraic Geometry Seminar.

Feb 21, 2013 'Finite generation in characteristic 0 and characteristic p', Michigan Commutative Algebra Seminar.

Oct 30, 2012 'Introduction to the Minimal Model Program' Michigan Postdoc Algebraic Geometry Seminar.

Oct 16, 2012 'Singularities of Cox Rings' Harvard/MIT Algebraic Geometry Seminar.

Jun 19, 2012 'Singularities of Cox Rings of Fano Varieties', MFO Workshop on Classical Algebraic Geometry.

Jan 27, 2012 'Singularities of Cox Rings of Fano Varieties', University of Utah Algebraic Geometry Seminar.

Jan 11, 2012 'Singularities of Cox Rings of Fano Varieties', Univeristy of Michigan Algebraic Geometry Seminar.

Oct 4, 2011 'Singularities of Cox Rings of Fano Varieties', UC Berkeley Commutative Algebra and Algebraic Geometry Seminar.

Jan 28, 2011 'A short introduction to Toric Varieties', UC Berkeley Student Algebraic Geometry Seminar.

Sept 10, 2010 'Chow Quotients' , UC Berkeley Student Algebraic Geometry Seminar.

Sept 22, 2010 'A Decomposition of the Gelfand-Kapranov-Zelevinsky Cone', UC Berkeley Student Seminar in Discrete Mathematics.

Teaching Experience:

2015 – Organized informal reading course on Berkovich and tropical geometry, University of Miami. Undergraduate courses taught: Calculus II, finite math, differential equations, linear algebra, discrete math, intro to abstract mathematics, and abstract algebra. Graduate courses taught: Graduate Algebra, Abstract Algebra, Algebraic geometry, topics course on toric varieties (Fall 2018), University of Miami.

2012 – 2015 Instructor for honors calculus, differential equations, multivariable calculus, and "Explorations in Mathematics", University of Michigan.

2007 – 2012 Graduate Student Instructor in calculus, multivariable calculus, linear algebra, and discrete mathematics for five semesters and two summers, UC Berkeley.

Undergraduate Research and Mentorship

2016–2020 Undergraduate advisor, University of Miami.

Winter 2014, 2015 Helped teach "Explorations in Mathematics", a class at Michigan focused on undergraduate research in mathematics.

Graduate Mentorship

ongoing - PhD advisor to Jiachang Xu, Muyuan Zhang.

Fall 2018-Spr 2019 - mentored a master's student, Sam Dhinsda, in a reading course in Commutative Algebra, following Atiyah and MacDonald's book.

Service

Fall 2019– Member of Faculty Learning Community (FLC), *Learning through Dialogue and Discussion*. The FLC is part of the University of Miami's Quality Enhancement Plan, which aims to improve undergraduate education by transforming courses from a lecture style to a discussion style.

	Refereed papers for *IMRN*, *Duke Math Journal*, *Journal of Algebraic Geometry*, *Michigan Math Journal*, and *Mathematics Zeitschrift*.
2019	Served on David Udumyan's dissertation committee.
Spr 2017	Served on Christopher Langdon's dissertation committee.
2017	Refereed a paper for *Math Research Letters*
2016-present	Essner Committee, University of Miami. The Essner Committee writes and administers a mathematics competition for local high school students.
Spr 2014	Served on Xin Zhou's dissertation committee.

Other Activities:

Feb 2020	Speaker at Miami Nerd Nite.
Spring 2020	Speaker at Essner Competition.
Fall 2016	Gave an expository talk on Pólya Enumeration at the award ceremony for the 2016 Essner competition.
Fall 2016–	Faculty advisor to the University of Miami Math Union, an undergraduate math club.
2012 – 2014	Organizer for a Friday math postdoc happy hour.
December 2014	Participated in the Wolverine Express, a University of Michigan based outreach program to local high schools.
Oct 2014	Gave an expository talk on 'Hex and the Brouwer Fixed Point Theorem' in the Michigan Math club.
Summer 2014	Organized a summer coffee and cake social event in the Michigan math department.
Summer 2010	Mathematical Consultant for a production of David Auburn's *Proof* at Lafayatte's Town Hall Theater, directed by Clive Worsley.
Jan-Feb 2012	Mathematical Consultant for a production of Tom Stoppard's *Arcadia* at Live Oak Theater in Berkeley, directed by Robert Estes.