

DJ Bruce

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Education

- **University of Wisconsin** Madison, WI
Ph.D. Mathematics 2014 – Present
– Advisor: Daniel Erman
- **University of Wisconsin** Madison, WI
M.A. Mathematics 2014 – 2016
- **University of Michigan** Ann Arbor, MI
B.S. in Mathematics & Political Science 2010 – 2014
– With High Honors and Distinction

Publications

4. M. Brandt, D. Bruce, T. Brysiewicz, R. Krone, and E. Robeva. The degree of $SO(n)$. *Submitted*. E-print: [arXiv:1701.03200](https://arxiv.org/abs/1701.03200).
3. D. Bruce and D. Erman. A probabilistic approach to systems of parameters and Noether normalization. *Submitted*. E-print: [arXiv:1604.01704](https://arxiv.org/abs/1604.01704).
2. D. Bruce, M. Logue, and R. Walker. Monomial valuations, cusp singularities, and continued fractions. *Journal of Commutative Algebra*, **7** (2015) no. 4, 495-522. E-print: [arXiv:1311.6493](https://arxiv.org/abs/1311.6493).
1. D. Bruce, P. Kao, E. Nash, B. Perez, and P. Vermeire. Betti tables of reducible algebraic curves. *Proc. Amer. Math. Soc.* **142** (2014) 4039-4051. E-print: [arXiv:1210.3064](https://arxiv.org/abs/1210.3064).

Awards, Grants & Honors

- **Graduate Research Fellowship** 2015 –
National Science Foundation
- **Professional Development Grant – \$1000** December 2016
Graduate School – University of Wisconsin
- **Outstanding Achievement in Mathematics** May 2014
Dept. of Mathematics – University of Michigan
- **Phi Beta Kappa** April 2014
University of Michigan

- **Chancellor's Opportunity Award** April 2014
University of Wisconsin
- **James B. Angell Scholar (2-times)** March 2013/2014
University of Michigan
- **University Honors (5-times)** 2010 – 2014
University of Michigan
- **MAA Student Travel Grant** November 2012
Mathematics Association of America
- **Research Travel Scholarship** November 2012
Honors College – University of Michigan
- **M.S. Keeler Scholarship** April 2012
Dept. of Mathematics – University of Michigan
- **William J. Branstrom Freshman Prize** February 2011
University of Michigan

Presentations

Research Presentations

- **A Probabilistic Approach to Noether Normalization (Poster)** Fields Institute
Introductory Workshop: Combinatorial Algebraic Geometry August 2016
- **A Probabilistic Approach to Noether Normalization (Poster)** University of Michigan
Commutative Algebra and Its Interactions with Algebraic Geometry July 2016
- **A Probabilistic Approach to Noether Normalization (Poster)** University of Notre Dame
Midwest Commutative Algebra and Algebraic Geometry Conference May 2016
- **Noether Normalization in Families** University of Wisconsin
Algebraic Geometry Seminar April 2016
- **Probability of Systems of Parameters** University of Wisconsin
Speciality Exam February 2016
- **Betti Tables of Graph Curves** University of Illinois - Chicago
Midwest Algebraic Geometry Graduate Conference April 2015
- **Counting and the Grothendieck Ring** University of Wisconsin
Graduate Number Theory Seminar March 2015
- **Betti Diagrams of Graph Curves** University of Wisconsin
Algebraic Geometry Seminar December 2014
- **The Resolution of Cusp Singularities and Continued Fractions** Ohio State University
Young Mathematicians Conference August 2013
- **The Resolution of Cusp Singularities and Continued Fractions** University of Michigan
REU Seminar July 2013
- **Betti Tables of Reducible Algebraic Curves** San Diego, CA
Joint Math Meetings REU Session January 2013
- **Betti Tables of Reducible Algebraic Curves** San Diego, CA
Joint Math Meetings Poster Session January 2013

- **Betti Tables of Reducible Algebraic Curves**
REU Seminar University of Michigan
August 2012
- **Betti Tables of Reducible Algebraic Curves**
Summer Undergrad Michigan Math Research Conference Michigan State University
July 2012
- **A Geometric Median in Banach Spaces and Applications to Robust PCA**
REU Seminar (University of Michigan) August 2011

Expository Presentations

- **The Many Faces of Grassmannians**
Examples in Algebraic Geometry (Reading Group) University of Wisconsin
February 2017
- **Complexity in Algebraic Geometry**
Positivity in Algebraic Geometry (Reading Group) University of Wisconsin
October 2016
- **Some Numbers Are Sometimes Bigger Than Others (Sometimes...)**
Donut Seminar University of Wisconsin
October 2016
- **Vignettes in Algebraic Geometry**
Graduate Algebraic Geometry Seminar University of Wisconsin
September 2016
- **A Crazy Way to Define Homology**
Donut Seminar University of Wisconsin
April 2016
- **Divisors and Stuff (3 Lectures)**
Graduate Algebraic Geometry Seminar University of Wisconsin
March 2016
- **Counting Categorically**
Graduate Number Theory Seminar University of Wisconsin
January 2016
- **The Ring**
Graduate Algebraic Geometry Seminar University of Wisconsin
September 2015
- **The Important Questions**
Graduate Number Theory Seminar University of Wisconsin
September 2015
- **Bertini Theorems In Different Settings**
Graduate Algebraic Geometry Seminar University of Wisconsin
April 2015
- **Mean, Median, Mode - Well Actually Just Median**
Donut Seminar University of Wisconsin
February 2015
- **Rational Varieties and Rational Points**
Graduate Number Theory Seminar University of Wisconsin
February 2015
- **Topics in Resolutions of Singularities**
Graduate Algebraic Geometry Seminar University of Wisconsin
October 2014
- **Complex Dynamics and Number Theory**
Graduate Number Theory Seminar University of Wisconsin
October 2014
- **Hex on the Beach**
Donut Seminar University of Wisconsin
September 2014
- **Complex Dynamics: A Primer**
Michigan Math Undergrad Seminar Lunch (MMUSSL) University of Michigan
May 2014
- **Resolving Singularities**
Math Club University of Michigan
January 2014

Outreach Presentations

- **Shhh, This Message is Secret** East High School
Madison Math Circle October 2016
- **Shhh, This Message is Secret** West High School
Madison Math Circle October 2016
- **Is any knot not the unknot?** University of Wisconsin
Madison Math Circle September 2016
- **Game Busters** Science Saturday
Madison Math Circle August 2016
- **Is any knot not the unknot?** Madison East High School
Madison Math Circle May 2016
- **To Infinity and Beyond!** James Madison Memorial High School
Madison Math Circle April 2016
- **Can you untie a knot with a knot?** Madison West High School
Madison Math Circle April 2016
- **To Infinity and Beyond!** University of Wisconsin
Madison Math Circle November 2015
- **Finding the Right Questions** University of Wisconsin
Madison Math Circle April 2015
- **Is Any Knot Not the Unknot** University of Wisconsin
Madison Math Circle September 2014
- **How Big is Infinity?** Brighton High School
Guest Lecture May 2013

Teaching Experience

- **Math 132: Problem Solving in Algebra, Statistics, & Probability** University of Wisconsin
Instructor Spring 2015
- **Math 221: Calculus and Analytic Geometry I** University of Wisconsin
Teaching Assistant Fall 2014
- **Hex and the 4 C's** Michigan Math and Science Scholars
Course Assistant Summer 2014
- **Math 310: Explorations in Randomness** University of Michigan
Course Assistant Winter 2014
 - Assisted facilitating inquiry based learning in the classroom.
 - Responsible for office hours, grading, and review sessions.
- **Math 490: Introduction to Topology** University of Michigan
Course Assistant Fall 2013
 - Assisted facilitating inquiry based learning in the classroom.
 - Responsible for office hours, grading, and review sessions.
- **Graph Theory** Michigan Math and Science Scholars
Course Assistant Summer 2013

- **Math 351: Principals of Analysis**
Course Assistant University of Michigan
Winter 2013
- **Math 105: Data, Functions, and Graphs**
Course Assistant University of Michigan
Fall 2012
- **Math Lab**
Tutor University of Michigan
Fall 2011 – Winter 2013

Participation in Select Workshops

- **Arizona Winter School: Perfectoid Spaces**
Southwest Center for Arithmetic Geometry Tucson, AZ
March 2017
- **Apprenticeship Weeks**
Fields Institute Toronto, ON
August 2016
- **Macaulay2 Workshop 2016**
University of Utah Salt Lake City, UT
May 2016
- **Summer Institute in Algebraic Geometry**
University of Utah Salt Lake City, UT
July 2015
- **Macaulay2 Workshop 2015**
Boise State University Boise, ID
May 2015
- **Arizona Winter School: Arithmetic and Higher-Dimensional Varieties**
Southwest Center for Arithmetic Geometry Tucson, AZ
March 2015
- **AMS Short Course in Random Matrix Theory**
Joint Math Meetings San Diego, CA
January 2013
- **Intro to Topological Invariants in Low Dimensions**
Undergrad Summer School at Notre Dame University South Bend, IN
May 2012

Research Experiences

- **Research Experience for Undergraduates**
Advisor: Prof. Karen Smith University of Michigan
Summer 2013
– Research in algebraic geometry and commutative algebra.
- **Research Experience for Undergraduates**
Advisor: Prof. Pete Vermeire Central Michigan University
Summer 2012
– Research in algebraic geometry.
- **Research Experience for Undergraduates**
Advisor: Prof. Roman Vershynin University of Michigan
Summer 2011
– Research in geometric analysis with applications to PCA.

Outreach Activities

- **Madison Math Circle**
Lead Organizer University of Wisconsin
January 2016 – Present

- **Madison Math Circle**
Student Volunteer University of Wisconsin
January 2015 – Present
- **Madison Mega Math Meet**
Graded University of Wisconsin
May 2015
- **Bonding Undergraduate and Graduate Students**
Mentor for Undergraduate University of Wisconsin
September 2014 – December 2014
- **Michigan Math Circle**
Organizer University of Michigan
January 2013 – June 2014

Service

- **Committee on Inclusivity and Diversity**
Member UW Dept. of Mathematics
November 2016 – Present
- **Committee on TA Pay and Performance**
Member UW Dept. of Mathematics
September 2015 – Present
- **AMS Graduate Student Blog**
Editor American Mathematical Society
September 2015 – Present
- **AMS Graduate Student Chapter**
Member University of Wisconsin
September 2014 – Present
- **Instructor Excellence Program**
Teaching Mentor UW Dept. of Mathematics
September 2015 – May 2016
- **Michigan Math Undergrad Seminar Lunch**
Organizer University of Michigan
Summer 2014
- **Society of Undergraduate Math Students**
President and Founder University of Michigan
December 2012 – June 2014

Memberships

- **Society of Industrial and Applied Mathematics** January 2017 – Present
- **Association for Women in Mathematics** January 2016 – Present
- **American Mathematical Society** September 2014 – Present