

Juliette Bruce

Department of Mathematics
University of Wisconsin
480 Lincoln Dr.
Madison, WI 53706

December 9, 2017

608-263-7939
juliette.bruce@math.wisc.edu
math.wisc.edu/~juliettebruce

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

6. J. Bruce. Asymptotic Syzygies in the Semi-Ample Setting. *In preparation*.
5. J. Bruce, D. Erman, S. Goldstein, and J. Yang. Conjectures and computations about Veronese syzygies. *Submitted*. E-print: [arXiv:1711.03513](https://arxiv.org/abs/1711.03513).
4. M. Brandt, J. Bruce, T. Brysiewicz, R. Krone, and E. Robeva. The degree of $SO(n)$. *Combinatorial Algebraic Geometry*, 207-224, Fields Inst. Commun. **80**, (2017). E-print: [arXiv:1701.03200](https://arxiv.org/abs/1701.03200).
3. J. 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. J. 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. J. 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 – Present
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

- **Asymptotic Syzygies in the Semi-Ample Setting (Poster)** San Diego, CA
Joint Math Meetings AWM Poster Session January 2018
- **Asymptotic Syzygies in the Semi-Ample Setting** University of Michigan
Commutative Algebra Seminar December 2017
- **Asymptotic Syzygies in the Semi-Ample Setting** Texas Tech University
Structures on Free Resolutions October 2017
- **A Distributed Numerical Approach to Syzygies of \mathbb{P}^2 (Poster)** UC - Berkeley
Free Resolutions and Computations July 2017
- **The Degree of $SO(n)$ and Low-rank SDP** University of Wisconsin
Applied Algebra Seminar March 2017
- **A Probabilistic Approach to Noether Normalization (Poster)** Rice University
Lectures on Arithmetic Geometry February 2017
- **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**
Speciality Exam University of Wisconsin
February 2016
- **Betti Tables of Graph Curves**
Midwest Algebraic Geometry Graduate Conference University of Illinois - Chicago
April 2015
- **Counting and the Grothendieck Ring**
Graduate Number Theory Seminar University of Wisconsin
March 2015
- **Betti Diagrams of Graph Curves**
Algebraic Geometry Seminar University of Wisconsin
December 2014
- **The Resolution of Cusp Singularities and Continued Fractions**
Young Mathematicians Conference Ohio State University
August 2013
- **The Resolution of Cusp Singularities and Continued Fractions**
REU Seminar University of Michigan
July 2013
- **Betti Tables of Reducible Algebraic Curves**
Joint Math Meetings REU Session San Diego, CA
January 2013
- **Betti Tables of Reducible Algebraic Curves**
Joint Math Meetings Poster Session San Diego, CA
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**
Madison Math Circle East High School
October 2016
- **Shhh, This Message is Secret**
Madison Math Circle West High School
October 2016
- **Is any knot not the unknot?**
Madison Math Circle University of Wisconsin
September 2016
- **Game Busters**
Madison Math Circle Science Saturday
August 2016
- **Is any knot not the unknot?**
Madison Math Circle Madison East High School
May 2016
- **To Infinity and Beyond!**
Madison Math Circle James Madison Memorial High School
April 2016
- **Can you untie a knot with a knot?**
Madison Math Circle Madison West High School
April 2016
- **To Infinity and Beyond!**
Madison Math Circle University of Wisconsin
November 2015
- **Finding the Right Questions**
Madison Math Circle University of Wisconsin
April 2015
- **Is Any Knot Not the Unkot**
Madison Math Circle University of Wisconsin
September 2014
- **How Big is Infinity?**
Guest Lecture Brighton High School
May 2013

Teaching Experience

- **Math 132: Problem Solving in Algebra, Statistics, & Probability**
Instructor University of Wisconsin
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** University of Michigan
Course Assistant *Winter 2013*
- **Math 105: Data, Functions, and Graphs** University of Michigan
Course Assistant *Fall 2012*
- **Math Lab** University of Michigan
Tutor *Fall 2011 – Winter 2013*

Participation in Select Workshops

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

Research Experiences

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

Outreach Activities

- **Out in STEM (oSTEM) @ UW-Madison** University of Wisconsin
co-Founder July 2017 – Present
- **Madison Math Circle** University of Wisconsin
Lead Organizer January 2016 – Present
- **Madison Math Circle** University of Wisconsin
Student Volunteer January 2015 – Present
- **Madison Mega Math Meet** University of Wisconsin
Graded May 2015
- **Bonding Undergraduate and Graduate Students** University of Wisconsin
Mentor for Undergraduate September 2014 – December 2014
- **Michigan Math Circle** University of Michigan
Organizer January 2013 – June 2014

Service

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