Juliette Bruce

June 18, 2019

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

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

10. J. Bruce. The Quantitative Behavior of Asymptotic Syzygies for Hirzebruch Surfaces. *Submitted.* E-Print: arXiv:1906.07333.

9. J. Bruce, D. Erman, S. Goldstein, and J. Yang. The SchurVeronese package in Macaulay2. *Submitted.* E-print: arXiv:1905.12661.

8. A. Almousa, J. Bruce, M. Loper, and M. Sayrafi. The Virtual Resolutions Package for Macaulay2. *Submitted.* E-print: arXiv:1905.07022.

7. J. Bruce. Asymptotic Syzygies in the Setting of Semi-Ample Growth. *Submitted.* E-Print: arXiv:1904.04944

6. J. Bruce and W. Li. Effective bounds on the dimensions of Jacobians covering abelian varieties. *Submitted.* E-print: arXiv:1804.11015.

5. J. Bruce, D. Erman, S. Goldstein, and J. Yang. Conjectures and computations about Veronese syzygies. *Experimental Mathematics*, To Appear. E-print: arXiv: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.

3. J. Bruce and D. Erman. A probabilistic approach to systems of parameters and Noether normalization. *Submitted.* E-print: arXiv: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.

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.

Grants

- **Conference Grant DMS-1908799 – $15,000**   March 2019
  National Science Foundation
- **Graduate Research Fellowship**   2015 – 2018
  National Science Foundation
- **Conference Grant DMS-1812462 – $15,000**   February 2018
  National Science Foundation
- **Professional Development Grant – $1000**   December 2016
  Graduate School – University of Wisconsin

Awards & Honors

- **Elizabeth Hirschfelder Prize**   October 2018
  Dept. of Mathematics - University of Wisconsin
- **Mathematics TA Service Award**   April 2018
  Dept. of Mathematics - University of Wisconsin
- **Teaching Assistant Award for Exceptional Service**   February 2018
  University of Wisconsin (Campus Wide)
- **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

- **Semi-Ample Asymptotic Syzygies**
  Algebraic Geometry Seminar
  Stanford University
  May 2019

- **Asymptotic Syzygies for Products of Projective Space**
  Algebra Seminar
  University of Kentucky
  April 2019

- **Semi-Ample Asymptotic Syzygies**
  Commutative Algebra Seminar
  University of Minnesota
  April 2019

- **Asymptotic Syzygies for Products of Projective Space (Poster)**
  2019 AWM Research Symposium Poster Session
  Rice University
  April 2019

- **Asymptotic Syzygies for Products of Projective Space**
  KUMUNUjr.
  University of Nebraska
  March 2019

- **Asymptotic Syzygies for Products of Projective Space**
  Spring AMS Southeastern Sectional
  Auburn University
  March 2019

- **Asymptotic Syzygies for Products of Projective Space**
  Joint Math Meetings
  Baltimore, MD
  January 2019

- **Covering Abelian Varieties and Effective Bertini**
  Algebra and Algebraic Geometry Seminar
  University of Wisconsin
  October 2018

- **Asymptotic Syzygies for Products of Projective Space**
  Fall AMS Central Sectional
  University of Michigan
  November 2018

- **Asymptotic Syzygies in the Semi-Ample Setting (Poster)**
  AGNES Poster Session
  Brown University
  September 2018

- **Covering Abelian Varieties and Effective Bertini**
  Algebraic Geometry and Number Theory Seminar
  Rice University
  September 2018

- **Syzygies of Surfaces via Distributed Computing**
  Algebra Seminar
  DePaul University
  March 2018

- **Asymptotic Syzygies in the Semi-Ample Setting**
  Algebra and Algebraic Geometry Seminar
  University of Wisconsin
  February 2018

- **Asymptotic Syzygies in the Semi-Ample Setting (Poster)**
  Joint Math Meetings AWM Poster Session
  San Diego, CA
  January 2018

- **Asymptotic Syzygies in the Semi-Ample Setting**
  Commutative Algebra Seminar
  University of Michigan
  December 2017

- **Asymptotic Syzygies in the Semi-Ample Setting**
  Structures on Free Resolutions
  Texas Tech University
  October 2017

- **A Distributed Numerical Approach to Syzygies of $\mathbb{P}^2$ (Poster)**
  Free Resolutions and Computations
  UC - Berkeley
  July 2017

- **The Degree of $SO(n)$ and Low-rank SDP**
  Applied Algebra Seminar
  University of Wisconsin
  March 2017

- **A Probabilistic Approach to Noether Normalization (Poster)**
  Lectures on Arithmetic Geometry
  Rice University
  February 2017

- **A Probabilistic Approach to Noether Normalization (Poster)**
  Introductory Workshop: Combinatorial Algebraic Geometry
  Fields Institute
  August 2016

- **A Probabilistic Approach to Noether Normalization (Poster)**
  Commutative Algebra and Its Interactions with Algebraic Geometry
  University of Michigan
  July 2016

- **A Probabilistic Approach to Noether Normalization (Poster)**
  Midwest Commutative Algebra and Algebraic Geometry Conference
  University of Notre Dame
  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**   University of Michigan
  REU Seminar   August 2012

- **Betti Tables of Reducible Algebraic Curves**   Michigan State University
  Summer Undergrad Michigan Math Research Conference   July 2012

- **A Geometric Median in Banach Spaces and Applications to Robust PCA**
  REU Seminar (University of Michigan)   August 2011

Expository Presentations

- **Intro to Moduli Spaces and Group Work**   University of Wisconsin
  AG Reading Seminar   March 2019

- **Kissing Conics**   University of Wisconsin
  Donut Seminar   October 2018

- **The Hilbert and Quot Schemes**   University of Wisconsin
  Examples in Algebraic Geometry (Reading Group)   April 2017

- **The Many Faces of Grassmannians**   University of Wisconsin
  Examples in Algebraic Geometry (Reading Group)   February 2017

- **Complexity in Algebraic Geometry**   University of Wisconsin
  Positivity in Algebraic Geometry (Reading Group)   October 2016

- **Some Numbers Are Sometimes Bigger Than Others (Sometimes...)**   University of Wisconsin
  Donut Seminar   October 2016

- **Vignettes in Algebraic Geometry**   University of Wisconsin
  Graduate Algebraic Geometry Seminar   September 2016

- **A Crazy Way to Define Homology**   University of Wisconsin
  Donut Seminar   April 2016

- **Divisors and Stuff (3 Lectures)**   University of Wisconsin
  Graduate Algebraic Geometry Seminar   March 2016

- **Counting Categorically** University of Wisconsin
  Graduate Number Theory Seminar *January 2016*
- **The Ring** University of Wisconsin
  Graduate Algebraic Geometry Seminar *September 2015*
- **The Important Questions** University of Wisconsin
  Graduate Number Theory Seminar *September 2015*
- **Bertini Theorems In Different Settings** University of Wisconsin
  Graduate Algebraic Geometry Seminar *April 2015*
- **Mean, Median, Mode - Well Actually Just Median** University of Wisconsin
  Donut Seminar *February 2015*
- **Rational Varieties and Rational Points** University of Wisconsin
  Graduate Number Theory Seminar *February 2015*
- **Topics in Resolutions of Singularities** University of Wisconsin
  Graduate Algebraic Geometry Seminar *October 2014*
- **Complex Dynamics and Number Theory** University of Wisconsin
  Graduate Number Theory Seminar *October 2014*
- **Hex on the Beach** University of Wisconsin
  Donut Seminar *September 2014*
- **Complex Dynamics: A Primer** University of Michigan
  Michigan Math Undergrad Seminar Lunch (MMUSSL) *May 2014*
- **Resolving Singularities** University of Michigan
  Math Club *January 2014*

Outreach Presentations

- **To Infinity and Beyond** East High School
  Madison Math Circle *October 2018*
- **The Best Slide** East High School
  Madison Math Circle *October 2018*
- **Building the Shortest Road** University of Wisconsin
  Madison Math Circle *April 2018*
- **Doodling Daydreams** Whitewater High School
  Madison Math Circle *November 2017*
- **Doodling Daydreams** East High School
  Madison Math Circle *March 2017*
- **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 Unkot**   University of Wisconsin
  Madison Math Circle   *September 2014*
- **How Big is Infinity?**   Brighton High School
  Guest Lecture   *May 2013*

Teaching Experience

- **Math 228: Wisconsin Emerging Scholars**   University of Wisconsin
  Instructor   *Fall 2018*
- **Math 221: Calculus and Analytic Geometry I**   University of Wisconsin
  Teaching Assistant & Course Coordinator   *Fall 2018*
- **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**   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

- **AMS Short Course in Sums of Sqaures** — Baltimore, MD
  Joint Math Meetings — *January 2019*
- **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 — *Summer 2013*
  - Research in algebraic geometry and commutative algebra.

- **Research Experience for Undergraduates** — Central Michigan University
  Advisor: Prof. Pete Vermeire — *Summer 2012*
  - Research in algebraic geometry.

- **Research Experience for Undergraduates** — University of Michigan
  Advisor: Prof. Roman Vershynin — *Summer 2011*
  - Research in geometric analysis with applications to PCA.

Conference Organizing

- **GWCAWMMG** — University of Minnesota
  April 12 - April 14, 2019
- **Geometry & Arithmetic of Surfaces** — University of Wisconsin
  February 9 - February 10, 2019
- **M2@UW** — University of Wisconsin
  April 14-17, 2018
- **Math Careers Beyond Academia** — University of Wisconsin
  April 14, 2017

Outreach Activities

- **Undergrad Directed Reading Program** University of Wisconsin
  Mentor *January 2018 – Present*
- **Graduate Peer Mentoringt** University of Wisconsin
  Mentor *September 2018 – December 2018*
- **Girls Math Night Out** University of Wisconsin
  Mentor *September 2018 – December 2018*
- **Madison Math Circle** University of Wisconsin
  Lead Organizer *January 2016 – December 2018*
- **Madison Math Circle** University of Wisconsin
  Student Volunteer *January 2015 – December 2018*
- **Out in STEM (oSTEM) @ UW-Madison** University of Wisconsin
  co-Founder *July 2017 – Math 2018*
- **Out in Math: Professional Issues Facing LGBTQ Mathematicians** MAA Panel at the JMM
  Panelist *January 2018*
- **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

- **AMS Graduate Student Blog** American Mathematical Society
  Editor *September 2015 – September 2018*
- **AMS Graduate Student Chapter** University of Wisconsin
  Member *September 2014 – September 2018*
- **Committee on Inclusivity and Diversity** UW Dept. of Mathematics
  Member *November 2016 – August 2017*
- **Committee on TA Pay and Performance** UW Dept. of Mathematics
  Member *September 2015 – August 2017*
- **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