Juliette Bruce

March 24, 2023

Department of Mathematics
Brown University
151 Thayer Street
Providence, RI 02912

juliette_bruce1@brown.edu
juliettebruce.github.io
810 - 623 - 7610

Employment

- **Brown University** — Providence, RI
  Postdoctoral Research Associate — *2022 – Present*
- **University of California, Berkeley** — Berkeley, CA
  NSF Postdoctoral Research Fellow — *2020– 2022*
- **Mathematical Sciences Research Institute** — Berkeley, CA
  Postdoctoral Fellow — *2020– 2021*
- **University of Wisconsin, Madison** — Madison, WI
  Teaching & Research Assistant — *2014– 2020*

Education

- **University of Wisconsin** — Madison, WI
  Ph.D. & M.A. in Mathematics — *2014 – August 2020*
- **University of Michigan** — Ann Arbor, MI
  B.S. in Honors Mathematics & Political Science — *2010 – 2014*

Publications & Submitted Pre-Prints

15. M. Brandt, J. Bruce, D. Corey. The virtual Euler characteristic for binary matroids. *Submitted.* E-Print: arXiv:2301.10108

14. J. Bruce, L. Cranton Heller, M. Sayrafi. Bounds on Multigraded Regularity. *Submitted.* E-Print: arXiv:2208.11115

13. J. Bruce, L. Cranton Heller, M. Sayrafi. Characterizing Multigraded Regularity on Products of Projective Space. *Submitted.* E-Print: arXiv:2110.10705

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

11. M. Brandt, J. Bruce, M. Chan, M. Melo, G. Moreland, C. Wolfe. On the Top-weight Cohomology of $\mathcal{A}_g$. *Geometry & Topology*, To appear. E-Print: arXiv:2012.02892

10. J. Bruce, D. Corey, D. Erman, S. Goldstein, R. Laudone, and J. Yang. Syzygies of $\mathbb{P}^1 \times \mathbb{P}^1$: Data and Conjectures. *Journal of Algebra*, **593** (2022) no. 1, 589-621. E-Print: arXiv:2104.14598

9. J. Bruce, D. Erman, S. Goldstein, and J. Yang. The Schur-Veronese package in Macaulay2. *Journal of Software for Algebra and Geometry*, **11** (2021), 83-87 E-print: arXiv:1905.12661

8. J. Bruce. The Quantitative Behavior of Asymptotic Syzygies for Hirzebruch Surfaces. *Journal of Commutative Algebra,* To appear. E-Print: arXiv:1906.07333

7. A. Almousa, J. Bruce, M. Loper, and M. Sayrafi. The Virtual Resolutions Package for Macaulay2. *Journal of Software for Algebra and Geometry*, **10** (2020), 50-60. E-print: arXiv:1905.07022

6. J. Bruce and D. Erman. A probabilistic approach to systems of parameters and Noether normalization. *Algebra and Number Theory*, **13** (2019), no. 9, 2081âĂŞ2102. E-print: arXiv:1604.01704

5. J. Bruce and W. Li. Effective bounds on the dimensions of Jacobians covering abelian varieties. *Proc. Amer. Math. Soc.*, **148** (2020), no. 2, 535-551. E-print: arXiv:1804.11015

4. J. Bruce, D. Erman, S. Goldstein, and J. Yang. Conjectures and computations about Veronese syzygies. *Experimental Mathematics*, **29** (2020), 398-413. E-print: arXiv:1711.03513

3. 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

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

Published Software

4. SchurVeronese, (co-authored with D. Erman, S. Goldstein, and J. Yang). Submitted for distribution with future releases of Macaulay2, a compute algebra system focused on computations in algebraic geometry.

3. VirtualResolutions, (co-authored with A. Almousa, M. Loper, and M. Sayrafi). Distributed with version 1.14+ of Macaulay2 (2019).

2. FrobeniusThresholds, (co-authored with D. Hernández, K. Schwede, D. Smolkin, P. Teixeira, and E. Witt). Distributed with version 1.14+ of Macaulay2 (2019).

1. TestIdeals, (co-authored with E. Bela, A. Boix, D. Ellingson, D. Hernández, Z. Kadyrsizova, M. Katzman, S. Malec, M. Mastroeni, M. Mostafazadehfard, M. Robinson, K. Schwede, D. Smolkin, P. Teixeira, and E. Witt). Distributed with version 1.14+ of Macaulay2 (2019).

Multimedia

1. SyzygyData.com, (with D. Erman, S. Goldstein, and J. Yang). An online public database on large-scale syzygy computations.

Grants

- Fields Institute Conference Grant – $23,000 — July 2022
- NSF Postdoctoral Research Fellowship DMS-2002239 – $150,000 — 2020 – 2022
- NSF Conference Grant DMS-1908799 – $15,000 — March 2019
- NSF Graduate Research Fellowship — 2015 – 2018

- NSF Conference Grant DMS-1812462 – $15,000 February 2018

Awards & Honors

- US Junior Oberwolfach Fellow April 2022
  Awarded to outstanding junior scientists from US
- Capstone Teaching Award October 2019
  Awarded to one student in the math department for an exceptional record of teaching excellence.
- Excellence in Mathematical Research Award October 2019
  Recognizes significant and substantial contributions to research as part of their thesis.
- Elizabeth Hirschfelder Prize October 2018
  Awarded to an outstanding female student.
- Teaching Assistant Award for Exceptional Service February 2018
  Campus-wide award recognizing TA's who perform exceptional service
- Outstanding Achievement in Mathematics May 2014
  Dept. of Mathematics – University of Michigan
- Phi Beta Kappa April 2014
  University of Michigan

Select Invited Talks

- **Seminars & Colloquiums**: Brown University, Dartmouth College, Harvard University, Max Planck Institute for Mathematics in the Sciences, Princeton University, Simon Fraser University, Stanford University, University of California - Berkeley, University of Michigan, University of Minnesota, University of Notre Dame, University of Utah, University of Texas - Austin, University of Washington
- **Conferences**: Algebraic Geometry Northeast Series (AGNES), AMS Sectional Meetings (x10), Bay Area Discrete Math Day, CA+, CMS Winter Meetings, Foundations of Computational Mathematics, Joint Math Meetings (x4), Oberwolfach Research Institute, SIAM Conference on Applied Algebraic Geometry (x2), Structures on Free Resolutions, Western Algebraic Geometry Online

Professional Skills & Activities

- **Programming Languages**: Macaulay2 (advanced), LaTeX (advanced), Python (intermediate), Matlab (intermediate), HTML&CSS (begineer)
- **Conferences Organized**: I have organized over 10 research conferences ranging from narrowly focused events with 20 participants to large international conferences with over 100 participants.