# Juliette Bruce, Ph.D.

# PROFESSIONAL HIGHLIGHTS

My research in mathematics brings together computational, combinatorial, and algebraic tools a to study the geometry of zero loci of systems of polynomials. I am now excited to apply my mathematical and program to ADD SPECFIC

- Co-authored 15 research articles that have been, or are submitted, for publication in top peer-reviewed journals.
- Awarded over \$300,000 in research grants including the extremely competitive NSF Postdoctoral Research Fellowship.

#### WORK EXPERIENCE

#### Postdoctoral Research Associate

AUG. 2022 - PRESENT

Brown University

Established myself as a leading early-career researcher, with a strong commitment to mentorship and developing cross-field collaborations.

• Served as a member of the Software Presentation Committee for the International Symposium for Symbolic and Computational Algebra.

#### NSF Postdoctoral Research Fellow

AUG. 2020 – JUL. 2022

University of California, Berkeley

Developed a successful independent research program that brought together ideas from numerous areas of mathematics.

 Mentored several graduate and undergraduate students projects resulting in multiple research articles submitted for publication.

#### **Graduate Assistant**

AUG. 2014 - JUL. 2020

University of Wisconsin, Madison

Teaching Assistant for 5 semesters and Research Assistant for 7 semesters the Mathematics Department.

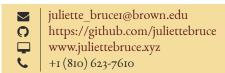
- Developed interactive teaching materials on a weekly basis, and oversaw a team of other TA's as a head TA.
- Received the highest departmental and campus-wide awards for teaching: Capstone Teaching Award (2019) and Teaching Assistant Award for Exceptional Service (2018).
- Received the Excellence in Mathematical Research Award (2019) for significant and substantial contributions to research.

#### PROGRAMMING EXPERIENCE

BEGINNER HTML/CSS

INTERMEDIATE Python, Matlab

EXPERT Macaulay2, Latex



#### **EDUCATION**

2014 - 2020 Ph.D. in Mathematics
 University of Wisconsin, Madison
 2014 - 2016 M.A. in Mathematics
 University of Wisconsin, Madison
 2010 - 2014 B.S. in Mathematics & Political Science
 WITH HIGH HONORS & DISTINCTION
 University of Michigan

#### **SKILLS**

#### Event Organizing

 Organized 10 research conferences ranging from narrowly focused events with 20 participants to large international conferences with over 100 participants.

Technical & Non-Technical Communication

- Gave over 75 invited research presentations at national and international conferences and seminars, including: Harvard, Princeton, Stanford, UC Berkeley, and UT Austin.
- Gave 25 general audience talks aimed at promoting mathematics to the public.

#### Leadership

- As lead organizer (2016-2018) for the Madison Math Circle, created new programming and community iniatives that increased attendance from 25 to 250 students per year.
- As the inaugural president (2022) for Spectra, the association for LGBTQ+ mathematicians, and oversaw a fundraiser that raised over \$20,000.

# SELECT PROJECTS

Computational Algebra Packages for Macaulay2

Developed four peer-reviewed software packages extending the functionality of the open-source computer algebra software Macaulay2. These packages are included (or will be included) with the standard distribution of Macaulay2.

# Computing Algebraic Invariants

Led a collaborative research project that brought together tools from numerical linear algebra, high throughput computing, and homological algebra to develop novel approaches to computing algebraic invariants called syzygies.

Foundations of AI/ML in Computer Algebra

An ongoing project to develop robust datasets to allow the development of artificial intelligence/machine learning methods in computational algebraic geometry.

Exploring Trends in News Coverage of Science

Using Python I created and analyzed a database to explore how Quanta covers different areas of science and mathematics by looking at which preprints are cited.

# **PUBLICATIONS**

**Freeman, G. R.** (1996). Chemistry of Multiply Charged Negative Molecular Ions and Clusters in the Gas Phase: Terrestrial and in Intense Galactic Magnetic Fields. *The Journal of Physical Chemistry*, 100(11), 4331-4338.

Jacobsen, F. M., Gee, N., **Freeman, G. R.** (1986). Electron mobility in liquid krypton as function of density, temperature, and electric field strength. *Physical Review A*, 34(3): 2329-2335.