Juliette Bruce, Ph.D.

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PROFESSIONAL HIGHLIGHTS

I am now excited to apply my mathematical and programming skills to develop ML/AI frameworks to address challenging problems. My research in mathematics brings together computational, combinatorial, and algebraic tools to study the geometry of zero loci of systems of polynomials.

- 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, Pandas, SQL
INTERMEDIATE	Python, Matlab
EXPERT	Macaulay2, Latex

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 and high throughput computing to develop novel approaches to computing syzygies. Created a website to make the data available to other researchers.

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.

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 initiatives 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.

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