Juliette Bruce
Postdoctoral Researcher
Department of Mathematics
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October 22, 2023

Dear Committee Members,

I am writing to apply for the tenure-track assistant professorship in the Department of Mathematics at Dartmouth College. Currently, I am a postdoctoral researcher in the Mathematics Department at Brown University, a position I have held since August 2022. I received my Ph.D. in Mathematics from the University of Wisconsin - Madison under the guidance of my advisor Professor Daniel Erman in 2020. From 2020-2022 I was an NSF Postdoctoral Fellow in the Mathematics Department at the University of California, Berkeley. Additionally, I was a postdoctoral fellow at the Mathematical Sciences Research Institute for the 2020-2021 academic year.

My research interests lie in the intersection of algebraic geometry and commutative algebra with connections to combinatorics and number theory. I am interested in using homological, combinatorial, and computational methods to study the geometry of algebraic varieties. Currently, my research program has two broad directions.

(i) I have sought to deepen and expand our understanding of the ways homological algebra can be used to study the geometry of toric varieties. This seeks to generalize a very classical story using homological algebra to understand subvarieties of projective space.

(ii) I have been studying the geometry and topology of various moduli spaces, e.g., the moduli space of (principally polarized) abelian varieties of a fixed dimension, via combinatorially and homological methods. This has led to novel applications to the cohomology of certain arithmetic groups.

Further, I am passionate about promoting inclusivity, diversity, and justice in the mathematics community. This passion extends throughout my teaching where I am dedicated to creating an interactive and supportive classroom environment that helps students thrive.

My research output includes 15 papers, with publications in journals such as *Algebra & Number Theory*, *Geometry & Topology*, and *Experimental Mathematics*, as well as, multiple published software packages. Below are a few of the non-research highlights of my file.

- I was awarded a *NSF Postdoctoral Research Fellowship*, a *NSF Graduate Research Fellowship*, and I have secured over $100,000 in conference grants including 4 NSF conference grants.
- I have organized 12+ conferences, workshops, and special sessions, including multiple events aimed at supporting and promoting mathematicians from generally underrepresented groups, especially women and LGBTQ+ mathematicians.
- I was awarded the highest departmental and campus-wide teaching awards at the University of Wisconsin - Madison, the Capstone Teaching Award (2019) and the Teaching Assistant Award for Exceptional Service (2018), awarded to 1 and 3 students each year respectively.

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I am especially interested in the position given the Department of Mathematics's and Dartmouth's commitment to fostering and supporting a diverse, equitable, and inclusive campus community. In particular, I would be excited to help contribute to and support programs such as the Women in Science Program, and would also be committed to creating new initiatives for example programs aimed at supporting LGBTQ+ students and students of color.

With my application, I include the standard AMS cover sheet, a curriculum vitae, a research statement, a teaching statement, a diversity statement, and a publication list. I will have five letters of recommendation. Four research letters: Christine Berkesch (cberkesc@umn.edu), Melody Chan (melody_chan@brown.edu), Daniel Erman (erman@hawaii.edu), and Gregory G. Smith (ggsmith@mast.queensu.ca), and one teaching letter from Shirin Malekpour (shirin.malekpour@wisc.edu).

Please do not hesitate to contact me with any questions, or if there is anything else I can provide, and thank you in advance for your consideration.

Sincerely,

Juliette E. Bruce

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