



BROWN

Department of Mathematics

<https://www.juliettebruce.xyz>

juliette_bruce1@brown.edu

November 3, 2023

Juliette Bruce
Brown University
Providence, RI 02912

Dear Committee Members,

I am writing to apply for a position as a part-time lecturer in mathematics at Northeastern University. I am interested in this position because I am passionate about teaching and working with students, especially students from diverse backgrounds. Currently, I am a lecturer faculty member at San Francisco State University and a postdoctoral researcher in the Mathematics Department at Brown University. (Note that I live in San Francisco, CA, as I am working at Brown University remotely part-time.) I received my Ph.D. in Mathematics from the University of Wisconsin-Madison in 2020 under the guidance of my advisor Professor Daniel Erman. From 2020-2022 I was an NSF Postdoctoral Fellow in the Mathematics Department at the University of California, Berkeley.

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, engaging, and supportive classroom environment that helps students thrive. My goal as an educator is to be an active guide for students, providing them with environments where they feel supported and encouraged to let their own mathematical and quantitative curiosities guide how they engage and learn. By taking this approach, I hope to engage with students as the complete people that they are, asking them to bring all of their experiences, backgrounds, identities, and knowledge into the learning environment. I want students to experience mathematics in a humanistic way, seeing how mathematics and quantitative thinking are integral aspects of their lives. As one of my former students noted, “Juliette obviously wants us to succeed not only in math but in life.”

With my application, I have included my curriculum vitae, a teaching statement, a diversity statement, and three reference letters. A few highlights in my file are:

- Capstone Teaching Award (2019) - Awarded by the Department of Mathematics at the University of Wisconsin to 1 student recognizing a record of exceptional teaching and service.
- Teaching Assistant Award for Exceptional Service (2018) - Awarded by the University of Wisconsin to up to 3 teaching assistants campus-wide recognizing their exceptional service.

Please contact me with any questions, and thank you in advance for your consideration.

Sincerely,

Juliette E. Bruce

Juliette Bruce

Juliette Newton (née Bruce)

October 15, 2023

Department of Mathematics
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Providence, RI 02912

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Employment

- **Brown University** Providence, RI
Postdoctoral Research Associate 2022 – Present
- **San Francisco State University** San Francisco, CA
Lecturer Faculty 2023 – Present
- **University of California, Berkeley** Berkeley, CA
NSF Postdoctoral Research Fellow 2020– 2022
- **Mathematical Sciences Research Institute** Berkeley, CA
Postdoctoral Fellow 2020– 2021

Education

- **University of Wisconsin** Madison, WI
Ph.D. Mathematics 2014 – August 2020
– 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

Awards & Honors

- **US Junior Oberwolfach Fellow** April 2022
Awarded to outstanding junior scientists from US to participate in activities at Oberwolfach.
- **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.
- **Mathematics TA Service Award** April 2018
Dept. of Mathematics - University of Wisconsin
- **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
- **Chancellor's Opportunity Award** April 2014
University of Wisconsin

Teaching Experience

- **Math 197: Pre-Calculus I** San Francisco State University
Instructor Fall 2023
 - Sections ranged from 25-35 students on average, with typically teaching two sections at a time.
- **Math 107/110: Business Calculus** San Francisco State University
Instructor Fall 2023
 - Sections ranged from 25-35 students on average, with typically teaching two sections at a time.
- **Math 221: Calculus and Analytic Geometry I** University of Wisconsin
Teaching Assistant Fall 2014/2018/2019
 - Selected as a TA coordinator in 2018 and 2019, and was responsible for overseeing all other TA's and mentoring first year TA's.
 - Sections ranged from 25-35 students on average, with typically teaching two sections at a time.
 - Average score 4.9/5.0
- **Math 228: Wisconsin Emerging Scholars** University of Wisconsin
Instructor Fall 2018
 - Course providing students from underrepresented groups additional support.
 - Course had approximately 10-15 students.
 - Average score: 5.0/5.0, 100% amongst all TA's
- **Math 132: Wisconsin Emerging Scholars** University of Wisconsin
Instructor Spring 2015
 - Course had approximately 15-25 students.
 - Responsible for all aspects of the course.
- **Inquiry Based Learning Courses** University of Michigan
Course Assistant 2012-2014
 - Assisted with advanced undergraduate courses on topology, analysis, and probability.
 - Courses had approximately 25-35 students.
 - Facilitated inquiry based learning in the classroom, and responsible for office hours, grading, and review sessions.

Publications

15. 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](https://arxiv.org/abs/2012.02892)

14. 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](#)
13. 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](#).
12. J. Bruce. The Quantitative Behavior of Asymptotic Syzygies for Hirzebruch Surfaces. *Journal of Commutative Algebra*, To appear. E-Print: [arXiv:1906.07333](#).
11. 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](#).
10. J. Bruce and D. Erman. A probabilistic approach to systems of parameters and Noether normalization. *Algebra and Number Theory*, **13** (2019), no. 9, 2081–2102. E-print: [arXiv:1604.01704](#).
9. 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](#).
8. 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](#).
7. 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](#).
6. 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](#).
5. 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](#).

Pre-Prints

4. M. Brandt, J. Bruce, D. Corey. The virtual Euler characteristic for binary matroids. *Submitted*. E-Print: [arXiv:2301.10108](#)
3. J. Bruce, L. Cranton Heller, M. Sayrafi. Bounds on Multigraded Regularity. *Submitted*. E-Print: [arXiv:2208.11115](#)
2. J. Bruce, L. Cranton Heller, M. Sayrafi. Characterizing Multigraded Regularity on Products of Projective Space. *Submitted*. E-Print: [arXiv:2110.10705](#)
1. J. Bruce. Asymptotic Syzygies in the Setting of Semi-Ample Growth. *Submitted*. E-Print: [arXiv:1904.04944](#)

Software

4. SchurVeronese, (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 and commutative algebra.
3. VirtualResolutions, (with A. Almousa, M. Loper, and M. Sayrafi). Distributed with version 1.14 of Macaulay2 (2019).
2. FrobeniusThresholds, (with D. Hernández, K. Schwede, D. Smolkin, P. Teixeira, and E. Witt). Distributed with version 1.14 of Macaulay2 (2019).
1. TestIdeals, (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).

Non-Research Articles

2. J. Bruce. A Word from... Juliette Bruce, Inaugural President of Spectra. *Notices of the AMS*, **69** (2022) no. 6, 898–899.
1. A. Bonato, J. Bruce, and R. Buckmire. Spaces for All: The Rise of LGBTQ+ Mathematics Conferences. *Notices of the AMS*, **68** (2021) no. 6, 998–1003. <https://doi.org/10.1090/noti2288>

Multimedia

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

Grants

- **Conference Grant – \$23,000** July 2022
Fields Institute / National Science Foundation
- **Postdoctoral Research Fellowship – \$150,000** 2020 – 2022
National Science Foundation
- **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

Seminar and Colloquium Talks

• University of Vermont - Mathematics Colloquium	May 2023
• Princeton University - Algebraic Geometry Seminar	April 2023
• Dartmouth College - Algebra & Number Theory Seminar	April 2023
• Bowdoin College - Mathematics Colloquium	February 2023
• University of Texas - Austin - Geometry Seminar	December 2022
• Harvard/MIT - Algebraic Geometry Seminar	November 2022
• University of Kentucky - Algebra Seminar	November 2022
• San Francisco State University - Mathematistas Raising Voices Colloquium	April 2022
• COGENT Seminar - Held Virtually	March 2022
• Simon Fraser University - Number Theory & Algebraic Geometry Seminar	March 2022
• Reed College - Mathematics Colloquium	April 2021
• San Francisco State University - Algebra, Geometry, & Combinatorics Seminar	April 2021
• Algebra, Geometry, and Combinatorics Online - Held Virtually	February 2021
• MPI MiS - Non-linear Algebra Seminar Online	February 2021
• Syracuse University - Algebra Seminar	November 2020
• Arizona State University - AWM Seminar	October 2020
• Arizona State University - Number Theory Seminar	October 2020
• Louisiana State University - Algebra & Number Theory Seminar	October 2020
• University of Georgia - Algebraic Geometry Seminar	October 2020
• Stanford University - Algebraic Geometry Seminar	October 2020
• MSRI - The Fellowship of the Ring	September 2020
• University of Washington - Algebra & Algebraic Geometry Seminar	May 2020 [†]
• University of Nebraska - Commutative Algebra Seminar	April 2020 [†]
• University of Michigan - Commutative Algebra Seminar	December 2019
• University of Notre Dame - Algebraic Geometry Seminar	November 2019
• DePaul University - Algebra, Combinatorics, and Number Theory Seminar	October 2019
• Lawrence University - Mathematics Colloquium	October 2019
• University of Utah - Algebraic Geometry Seminar	September 2019
• Stanford University - Algebraic Geometry Seminar	May 2019
• University of Kentucky - Algebra Seminar	April 2019
• University of Minnesota - Commutative Algebra Seminar	April 2019
• Rice University - Algebraic Geometry and Number Theory Seminar	September 2018
• DePaul University - Algebra, Combinatorics, and Number Theory Seminar	March 2018
• University of Michigan - Commutative Algebra Seminar	December 2017

Conference Talks

[†]Canceled due to the COVID-19 pandemic.

- Workshop for Graduate Students: Syzygies & Regularity - UIC April 2023
- Spring AMS Southeastern Sectional - Georgia Tech University March 2023
- Algebraic Geometry Northeast Series (AGNES) - UMass Amherst November 2022
- Fall AMS Western Sectional - University of Utah October 2022
- Fall AMS Southeastern Sectional - University of Tennessee, Chattanooga October 2022
- BATMOBILE - Brown University May 2022
- CA+ - Iowa State University April 2022
- Joint Math Meetings (x2) - Seattle, WA January 2022[†]
- CMS Winter Meetings - Held Virtually December 2021
- Queer Research Showcase, QAtCanSTEM - Held Virtually November 2021
- Fall AMS Central Sectional - Held Virtually October 2021
- SIAM Conference on Applied Algebraic Geometry 2021 August 2021
- Queer and Trans in Combinatorics June 2021
- Math Summer Program for Inclusive Excellence June 2021
- Spring AMS Western Sectional - Held Virtually May 2021
- Spring AMS Central Sectional - Held Virtually April 2021
- Bay Area Discrete (BAD) Math Day - Held Virtually April 2021
- Spring AMS Southeastern Sectional - Held Virtually March 2021
- LGBTQ+Math - Fields Institute November 2020
- Written Geometry: Commutative Algebra - CIRM October 2020[†]
- Early Commutative Algebra Researchers (eCARS) - Held Virtually June 2020
- Foundations of Computational Mathematics - Simon Fraser University June 2020[†]
- Western Algebraic Geometry Online (WAGON) - Held Virtually April 2020
- CA+ - Iowa State University April 2020[†]
- Joint Math Meetings - Denver, CO January 2020
- Fall AMS Central Sectional - University of Wisconsin September 2019
- SIAM Conference on Applied Algebraic Geometry 2019 July 2019
- KUMUNUjr - University of Nebraska March 2019
- Spring AMS Southeastern Sectional - Auburn University March 2019
- Joint Math Meetings - Baltimore, MD January 2019
- Fall AMS Central Sectional - University of Michigan October 2018
- Structures on Free Resolutions - Texas Tech University October 2017
- Midwest Algebraic Geometry Graduate Conference - University of Illinois, Chicago April 2015

Poster Talks

- AWM Poster Session - Joint Math Meetings January 2020
- Summer School on Randomness and Learning in NLA - Max Plank Institute, Leipzig July 2019
- 2019 AWM Research Symposium - Rice University April 2019
- AWM Poster Session - Joint Math Meetings January 2018
- AGNES Poster Session - Brown University September 2018

- Lectures on Arithmetic Geometry - Rice University February 2017
- Introductory Workshop: Combinatorial Algebraic Geometry - Fields Institute August 2016
- Commutative Algebra and Its Interactions with Algebraic Geometry July 2016
- Midwest Commutative Algebra and Algebraic Geometry Conference May 2016

Conference & Seminar Organizing

- **GEMS in Combinatorics** AIM
March 27-31, 2023
- **Trans Math Day** Held Virtually
December 3, 2022
- **BATMOBILE** Amherst College
September 30, 2022
- **$\text{Spec}(\overline{\mathbb{Q}})$** Fields Institute
July 6-8, 2022
- **LGBTQ+ Math Day** Fields Institute
November 18, 2021
- **GEMS in Combinatorics** Held Virtually
September 1-2, 2021
- **Trans Math Day** Held Virtually
June 14-15, 2021
- **Western Algebraic Geometry Symposium (WAGS)** Held Virtually
April 23 - April 24, 2021
- **Trans Math Day** Held Virtually
December 5, 2020
- **CAZoom** Held Virtually
April 25 - April 26, 2020
- **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

Seminar & Session Organizing

- **Special Session on Combinatorial Algebraic Geometry** AMS Sectional
October 1 - October 2, 2022
- **Commutative Algebra & Algebraic Geometry Seminar** UC Berkeley
September 2021 - May 2022

- **Special Session on Commutative Algebra** AMS Sectional
May 1 - May 2, 2021
- **Experimental Talks in Algebraic Geometry** Held Virtually
May - July, 2020
- **Special Session on Combinatorial Algebraic Geometry** AMS Sectional
September 14 - September 15, 2019

Outreach Activities

- **Virtual Directed Readings in Geometry** Held Virtually
Organizer *February 2021 – April 2021*
 - Created a virtual, open access, directed reading program for undergraduate students.
 - Approximately 30 students signed up for the 5-week reading group.
- **Algebraic Geometry in the Time of COVID** Held Virtually
Shepard *June 2020 – October 2020*
 - A virtual, open access introductory course in algebraic geometry.
 - Approximately 1600 registered participants.
- **Undergrad Directed Reading Program** University of Wisconsin
Mentor *January 2018 – May 2019*
 - Lead two semester long reading projects on commutative algebra and algebraic geometry.
 - Lead an undergraduate women on a two semester reading project, and provided guidance on applying for REU's and graduate school.
- **Graduate Peer Mentoring** University of Wisconsin
Mentor *September 2018 – December 2018*
 - Mentored 5 first year graduate students from minority genders, organizing monthly dinners where the mentees could discuss issues they were facing.
- **Girls Math Night Out** University of Wisconsin
Mentor *September 2018 – December 2018*
 - Lead 2 women from local high schools on a semesters long project about cryptography.
- **Madison Math Circle** University of Wisconsin
Lead Organizer *January 2016 – December 2018*
 - Lead the creation of a new outreach program, which directly visits high schools around the state of Wisconsin to better serve students from underrepresented groups.
 - Expanded the total number of students reached per year from 25 to >250.
- **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*
 - Founded, at the time. the only campus resource specifically for LGBTQ+ individuals in STEM, and grew the organization to over 50 members.
 - Secured a travel grant to help 11 members (undergraduate and graduate students) attend the national oSTEM conference.

- **Madison Mega Math Meet**
Graded University of Wisconsin
May 2015
- **Bonding Undergraduate and Graduate Students**
Mentor for Undergraduate University of Wisconsin
September 2014 – December 2014
- **Michigan Math Circle**
Organizer University of Michigan
January 2013 – June 2014

Outreach Panels

- **Holding AMS Meetings in Localities with Discriminatory Practices**
Panelist Joint Math Meetings
January 2022
- **AWM 101: What You Need to Know about Women in Math**
Panelist Joint Math Meetings
January 2022
- **Equity, Diversity, and Inclusion in Mathematics**
Panelist CAIMS
June 2021
- **Diversity and Inclusion Panel**
Panelist Womxn in Math at Berkeley
April 2021
- **How to Stay Productive as a Researcher**
Panelist Lunch in the Time of COVID
June 2020
- **Mathematics Research Online: Hosting Virtual Events**
Panelist Held Virtually
May 2020
- **Supporting Transgender and Non-binary Students**
Organizer & Moderator MAA Panel at the JMM
January 2020
- **Out in Math: Professional Issues Facing LGBTQ Mathematicians**
Panelist MAA Panel at the JMM
January 2018

Service

- **Spectra: The Association for LGBTQ+ Mathematicians**
President September 2020 – January 2022
- **Communications in Algebra**
Communications Editor Editorial Board
September 2020 – Present
- **Spectra: The Association for LGBTQ+ Mathematicians**
Board Member September 2020 – January 2022
- **AMS Graduate Student Blog**
Writer & Editor American Mathematical Society
September 2015 – September 2018
- **Committee on Inclusivity and Diversity**
Member UW Dept. of Mathematics
November 2016 – August 2017
 - Created policies seeking to make the department a more welcoming, inclusive, and comfortable place. This included drafting the department's statement on inclusivity, and creating similar statements for syllabi to be used throughout the department.
- **Committee on TA Pay and Performance**
Member UW Dept. of Mathematics
September 2015 – August 2017

- Developed and implemented a new system to evaluate TA performance, with the goal of creating a more transparent, useful, and non-biased system.

- **Instructor Excellence Program**

Teaching Mentor

UW Dept. of Mathematics

September 2015 – May 2016

- **Society of Undergraduate Math Students**

President and Founder

University of Michigan

December 2012 – June 2014

Referee Work

- Algebra & Number Theory, Communications in Algebra, Journal of Algebra, Journal of Commutative Algebra, Journal of Pure and Applied Algebra, Mathematica Scandinavia, Research in the Mathematical Sciences, Rocky Mountain Journal of Mathematics

Memberships

- Society of Industrial and Applied Mathematics January 2017 – Present
- Association for Women in Mathematics January 2016 – Present
- American Mathematical Society September 2014 – Present

Juliette Bruce's Teaching Statement

I. Introduction. My goal as an educator is to be an active guide for students, providing them with environments where they feel supported and encouraged to let their own mathematical and quantitative curiosities guide how they engage and learn. By taking this approach, I hope to engage with students as the complete people that they are, asking them to bring all of their experiences, backgrounds, identities, and knowledge into the learning environment. I want students to experience mathematics in a humanistic way, seeing how mathematics and quantitative thinking are integral aspects of their lives. As one of my former students noted, "Juliette obviously wants us to succeed not only in math but in life." Recognizing that learning mathematics is not necessarily confined to the classroom I have sought out new and non-traditional teaching opportunities. My teaching has been recognized through both awards and student evaluations:

- In 2018, I was one of three graduate students recognized campus-wide with the Teaching Assistant Award for Exceptional Service.
- I received two TA awards from the math department, the TA Service Award (2018) and the Capstone Teaching Award (2019), the latter of which is awarded to just one teaching assistant each year, for an exceptional record of teaching excellence and service.
- My student evaluations are generally quite high; for instance, for one course 100% of students agreed that I was an effective teacher.

I have sought to develop and refine my skills as an educator, both by viewing each teaching assignment as my own opportunity for growth and learning and by actively seeking out learning from other educators and education experts. In particular, I have implemented evidence-based techniques to support and engage students from diverse backgrounds

II. Teaching Experiences. As a graduate student at the University of Wisconsin - Madison, I served as a teaching assistant and course coordinator for Calculus I for multiple semesters, the instructor of record for Math for Early Education Majors, and the instructor of record for a Calculus I course providing students from generally under-represented groups additional support during their first college math course. Additionally, for several semesters, I held a non-traditional teaching assistantship for my role as the organizer of the Madison Math Circle outreach program. My passion for promoting an interest in and excitement for math – especially for people from generally underrepresented groups – led me to take on teaching and outreach roles through the *Girls Math Night Out* program and the *Wisconsin Directed Reading Program*.

My postdoctoral positions at Brown University and the University of California, Berkeley did not allow me to have formal teaching responsibilities, however, I have actively sought out non-traditional teaching opportunities and mentoring opportunities. For example, in 2020, in response to the COVID-19 pandemic, I helped Ravi Vakil and others organize *Algebraic Geometry in the Time of COVID*, a massive open-access virtual algebraic geometry course, which drew over 1500 participants from around the world. Inspired by this experience, in 2021, I organized an online open access course, *Virtual Directed Reading in Geometry & Algebra*, aimed at undergraduates. During this time I continued to seek to grow as an educator. For example, while at the University of California, Berkeley I actively participated in a reading/working group exploring antiracist and anti-oppressive pedagogy in the mathematics classroom. Further, I personally sought to engage with ways to humanize mathematics and support underrepresented students by exploring the works of Pamela E. Harris, Aris Winger, Rochelle Gutiérrez, Luis Leyva, and Francis Su.

In the Fall of 2023, with a desire to return to the classroom and while working remotely at Brown University, I had the privilege to teach at San Francisco State University. I served as the instructor of record for two sections of Business Calculus and one section of Pre-Calculus I. Two of these sections were part of San Francisco State University's "supportive pathways program" which seeks to improve the retention and success of students from underserved and underrepresented communities by providing them extra support. Further, I participated in multiple teaching communities with the hope of learning more about how I could better support students from underserved and underrepresented communities. This has led to some of the most enriching and motivating teaching experiences I have had.

III. Teaching Philosophy and Strategies for Classroom Success. As an instructor, I view my role is to be an active guide. I encourage my students to explore, engage with, and question the course material for themselves. I try to structure much of the course around guided group work that gives students opportunities

to develop and discuss their understanding and confusion with their fellow students. In addition to encouraging students to take an active role in learning, this format also helps students to learn to vocalize their thought processes and ideas.

Active learning presents challenges to me and my students, most notably, the challenge of managing student mistakes. In many ways, the most significant moments during the learning process are not necessarily the moments of success, but the moments of failure. It is at this moment that students can recognize errors and gaps in their understanding of a subject and begin trying to correct them. It is also the moment that as an instructor I can understand what my students are finding difficult and nudge the conversation in such a way as to overcome these hurdles.

Making mistakes is hard, and most students, like most people, would prefer not to make mistakes. With this in mind, I think it is crucial to promote an inclusive environment where all students feel comfortable and safe participating. This environment encourages students to be open about what confuses them and where they are making mistakes. Creating an inclusive classroom environment requires active attention and work to maintain. However, in my experience, this work is well worth it.

My approach to creating an inclusive classroom environment has been influenced by the semester-long course *Inclusive Practices in the College Classroom*, which I took through the *Delta Program for Integrating Research, Teaching and Learning*. For example, one activity I implemented successfully asked students to brainstorm attributes from classes they found productive and attributes from classes they found less productive. After collecting a list of such attributes, we use this as a jumping-off point for forming community standards that we wish to shape our classroom environment. Examples of such community standards that my classes have often adopted include: “Respect everyone” and “Address the problem, not the person when discussing mistakes”. I have found this helps the students buy into the belief that the classroom is an inclusive space where it is safe to make mistakes.

However, beyond simply creating an inclusive learning environment I have also found it important to create a space where students feel comfortable bringing their whole selves, including all of their experiences, backgrounds, challenges, identities, struggles, and knowledge. For example, I recognize that all students, like all people, will have days when negative experiences outside the classroom affect their ability to engage in the classroom. This is even more true for students who face racism, sexism, homo/transphobia, and other systems of oppression. On such a day when students enter the classroom, I look to try to meet the students where they are. For example, sometimes this means I will walk the student to the campus mental health or cultural center, or sometimes it means I create new problems specifically to help keep the student’s mind off of whatever is troubling them. I try to make sure my students know I am there to provide them with whatever resources they need to succeed both in the classroom and in their life beyond. However, this human-centered approach also leads to many beautiful moments. For example, by allowing students to bring all of themselves to class they experience mathematics in a humanistic way, seeing how mathematics and quantitative thinking are an integral aspect of their life. I have found this often increases students’ motivation, as well as opens themselves up to making mistakes, growing, and learning.

IV. Sample Student Feedback. The effectiveness of my teaching is highlighted in student comments:

- “I’ve always struggle with math and I’ve had a lot of teachers that didn’t believe in me so because of this I’ve always dreaded math courses. But Juliette always showed she cared, was constantly encouraging, believed in our class, and taught the material really clearly. From her constant availability to help and great instructing, her class became one of my favorites and I am more successful in a math course than I’ve ever been before.”
- “She went around and tried helping each student... She cared about each student’s success in the class and tried her best to make everyone understand the material.”
- “Juliette obviously wants us to succeed not only in math but in life. She is always making sure we know our resources especially when it comes to health. She also always wishes us a good day/weekend and that is awesome.”

V. Conclusion. As a graduate student and postdoctoral scholar, I have found teaching to be extremely rewarding. I developed a passion for supporting and engaging students from diverse backgrounds. Going forward, I am excited for new opportunities to grow and learn as a teacher, continue to promote inclusivity, diversity, and justice in my teaching, and create human-centered learning environments for my students.

Juliette Bruce's Diversity Statement

I. Introduction. I believe strongly in the importance of inclusivity, diversity, and justice, and I am passionate about promoting these values within the mathematical community. I have worked hard to create a learning community that was as open and inclusive to as many people as possible. For example, I have worked to make mathematics more inclusive of people from underrepresented groups; by founding events like *Trans Math Day* and leading *Spectra: the Association for LGBTQ+ Mathematicians*. Further, to promote the success of mathematicians from underrepresented groups I organized numerous national and international workshops and conferences. Going forward, I am excited to continue working hard to promote these values through my research, teaching, and service.

II. Organizational Service. I have organized 10+ national/international conferences including *M2@UW* (45 participants), *Geometry and Arithmetic of Surfaces* (40 participants), *Graduate Workshop in Commutative Algebra for Women & Mathematicians of Minority Genders* (35 participants), *CAZoom* (70 participants), *Western Algebraic Geometry Symposium* (100 participants), *GEMS of Combinatorics* (40 participants), *Spec(\mathbb{Q})* (50 participants), *BATMOBILE* (30 participants), *GEMS of Combinatorics II* (30 participants), and *GEMS of Commutative Algebra* (40 participants). Additionally, I organized three special sessions at AMS Sectional Meetings and the Joint Math Meetings.

Multiple of these conferences were specifically aimed at supporting mathematicians from underrepresented groups. For example, *Graduate Workshop in Commutative Algebra for Women & Mathematicians of Minority Genders* focused on forming communities of women and non-binary researchers, and *Spec(\mathbb{Q})* highlighted the research of LGBTQ+ mathematicians in algebra, geometry, and number theory. Further, the “GEMS” workshops sought to build a diverse community of mathematicians to address gender equity in the mathematical community from new perspectives. Going forward I am interested in expanding these “GEMS” workshops to other areas of mathematics and creating cross-field discussions that broaden the standard notion of gender equity in mathematics.

When organizing these conferences I paid particular attention to making them as inclusive of women and non-binary researchers as possible. For example, I designed the registration form to be thoughtful of the concerns of transgender researchers and highlighted the locations of single occupancy and ADA-compliant restrooms. The importance of such efforts was highlighted by the following comment I received from a participant, “I just wanted to thank you for making this workshop inclusive for people with all gender identifications. ... I have always felt out of place when I participated in conferences/workshops for women when they do not specify that non-binary people are welcome ... I really appreciate those questions you put in the registration form. It means a lot to me.”

III. National & International Advocacy. As a postdoc, I looked to deepen the impact of my work by attempting to promote underrepresented groups in mathematics beyond just campus. For example, I have worked with the Executive Committee of the *Association for Women in Mathematics* to consider ways they could expand their support of women and non-binary mathematicians. In Winter 2023 I joined MSRI's *Committee on Women in Mathematics*. Since Fall 2020 I have organized *Trans Math Day*, an annual virtual conference promoting the work of transgender and non-binary mathematicians. This conference regularly has 50 participants. Highlighting the importance of such conferences one participant said, “I’ve been really considering leaving mathematics. [Trans Math Day] reminded me why I’m here and why I want to stay. If a conference like this had been around for me five years ago, my life would have been a lot better.” Further, I have been a board member for *Spectra: The Association for LGBTQ+ Mathematicians* since 2020, including as the inaugural president in 2022. In this role, I have overseen the growth and formalization of the organization, including the creation and adoption of bylaws, the creation of an invited lecture at the Joint Mathematics Meetings, and a \$20,000+ fundraising campaign. *Spectra* has 500 members.

Going forward I am excited to continue my work supporting LGBTQ+ students, and would love to continue building organizations to do so. In particular, given the amazing successes of programs like MSRI-UP and the EDGE Program, I would love to organize a summer REU program specifically aimed at supporting and promoting LGBTQ+ mathematicians. Further, I am in the early stages of planning a mentorship program to help guide LGBTQ+ undergraduates through the process of applying to graduate programs in

mathematics and helping young LGBTQ+ graduate students establish themselves. The plan would be to break participants into groups with each group having LGBTQ+ mathematicians at various career stages, thus allowing participants to exchange advice, find support, and build mentoring networks.

IIV A More Inclusive Learning Community. During the Fall of 2016, in response to a growing climate of hate, bias, and discrimination on campus, I led the creation of the Mathematics Department's *Committee on Inclusivity and Diversity*. As a member of this committee, I drafted what would become the department's commitment to inclusivity and non-discrimination. I also created syllabi statements that let students know about these department policies, and that inform them of campus resources. Everyone within the department is encouraged to use these statements.

While a graduate student I co-founded oSTEM@UW as a resource for LGBTQ+ students in STEM, which eventually grew to over fifty members. As one member said, "It made me very happy to see other friendly LGBTQ+ faces around... Thanks so much for organizing this stuff – it's really helpful". From 2017-2020 I led the campus social organization for LGBTQ+ graduate students, which had over 350 members. In this role, I have co-organized a weekly coffee social hour intended to give LGBTQ+ graduate students a place to relax, make friends, and discuss the challenges of being LGBTQ+ at the UW - Madison.

IV. Mentoring. Inspired by the mentoring that helped me navigate the challenges of being a woman in mathematics, I have worked hard to mentor people from underrepresented groups. While a graduate student, I led reading courses with three undergraduates. One of these students, an undergraduate woman, worked with me for over a year, during which time I helped her apply for summer research projects. Working with *Girls' Math Night Out* I lead two girls in high school through a project exploring cryptography. During 2018-2019, I mentored 6 first-year graduate students (all women, non-binary students, or students of color).

As a postdoc, I began research projects with three graduate students (a majority of whom identify with a generally underrepresented group). These projects have resulted in two pre-prints, with additional projects still ongoing. Throughout the Spring and Summer of 2022, I did a reading course with a first-year graduate woman on algebraic geometry. Additionally, I advised two summer research projects for undergraduate students. The first of these projects ran virtually during Summer 2021 when 6 undergraduates worked on a question related to the moduli space of Abelian varieties. In Summer 2022 I advised an undergraduate student on a research project related to my work on syzygies. This work is ongoing and will hopefully result in a paper. This student is now in graduate school for math and was awarded an NSF Graduate Fellowship.

V. Virtual Mathematics In response to the COVID-19 pandemic and the shift of many mathematical activities to virtual formats, I worked to find ways for these online activities to reach those often at the periphery. During the Summer and Fall of 2020, I helped with Ravi Vakil's *Algebraic Geometry in the Time of Covid* project. This massive online open-access course in algebraic geometry brought together $\sim 1,500$ participants from around the world. In Spring 2021, I organized an 8-week virtual reading course for undergraduates in algebraic geometry and commutative algebra.

IV. Expanding the Learning Community. The Madison Math Circle (MMC) is an outreach program sponsored by the UW - Madison Math Department. Its goal is to kindle excitement and appreciation of math in middle and high school students. In Fall 2014, I began volunteering with the MMC. At the time, the circle's main programming was a weekly on-campus lecture given by a member of the math department. After a year of volunteering, I stepped into the role of organizer. During my three years as an organizer, I worked to build stronger connections between the MMC, local schools and other outreach organizations focused on underrepresented groups. These ties helped the weekly attendance more than double, and grow substantially more diverse. I also led the creation of a new outreach arm of the MMC, which visits high schools around the state of Wisconsin to better serve students from underrepresented groups. This program has dramatically expanded the reach of the circle, and during my final year as an organizer, the MMC reached over 300 students.

VII. Conclusion. I have worked hard to develop programs, policies, and practices that promoted diversity, inclusion, and justice within the mathematical community. Going forward, I will continue promoting these values through my research, teaching, and service.