

# CHRISTINE BERKESCH

## Curriculum Vitae

Address: University of Minnesota  
School of Mathematics  
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### Employment

2019 – University of Minnesota, Associate Professor  
2013 – 2019 University of Minnesota, Assistant Professor  
2011 – 2013 Duke University, Assistant Research Professor  
2012 Fall MSRI (Mathematical Sciences Research Institute), Postdoctoral Fellow  
Program: Commutative Algebra  
2011 Spring Institut Mittag-Leffler, Postdoctoral Fellow  
Program: Algebraic Geometry with a view towards applications  
2010 – 2011 Stockholm University, NSF International Postdoctoral Fellow (Host: Mikael Passare)

### Education

2010 Ph.D. Purdue University, Mathematics (Advisor: Uli Walther)  
Thesis title: Euler–Koszul homology in algebra and geometry  
2004 B.A. Butler University, Mathematics, with Honors Thesis

### Awards

2022 AWM Research Symposium Plenary Address (Postponed from 2020)  
2022 AMS Spring Central Sectional Meeting Invited Address (Postponed from 2020)  
2019 Purdue University College of Science Early Career Alumni Award  
2019 Taylor Career Development Award: Recognizes exceptional contributions to teaching by a candidate for tenure during the probationary period at the University of Minnesota  
Spring 2013 Teaching evaluations in top 5% among undergraduate small course instructors at Duke  
2009 – 2010 Bilsland Dissertation Fellowship  
2007 Purdue University Graduate School Summer Research Grant  
2004 – 2006 Clare Boothe Luce Foundation Fellowship  
2000 – 2004 Lilly Endowment Community Scholarship: Full tuition award

### Funding

2023 Oct. AIM SQuaRE: Rings of differential operators over toric face rings III  
2023 – 2024 NSF DMS 2332592 Grant: Conference: Gender Equity in the Mathematical Study (GEMS) of Commutative Algebra  
2023 – 2024 NSF DMS 2302476 Grant: Conference: Macaulay2 Workshop and Mini-School  
2022 Sept. AIM SQuaRE: Rings of differential operators over toric face rings II  
2022 – 2023 NSF DMS 2206872 Grant: Grad MoCCA  
2021 Apr. AIM SQuaRE: Rings of differential operators over toric face rings I  
2020 – 2024 NSF DMS 2001101 Grant: Multigraded methods for syzygies, arrangements, and differential operators  
2020 – 2023 NSF DMS 1953962 Grant: An Upper Midwest Commutative Algebra Conference  
2019 – 2020 NSF DMS 1908799 Grant: Graduate Workshop in Commutative Algebra for Underrepresented Minorities  
2018 – 2023 NSF DMS 1745638 Grant: RTG: Combinatorics and Algebra  
2017 – 2020 NSF DMS 1661962 Grant: Homological commutative algebra & group actions in geometry  
2017 – 2018 NSF DMS 1744247 Grant: CA+: An Upper Midwest Commutative Algebra Conference

- 2017 – 2018 NSF DMS 1700748 Grant: Conference: Local cohomology in commutative algebra and algebraic geometry
- 2015 – 2017 NSF DMS 1549892 Grant: Upper Midwest Commutative Algebra Colloquium
- 2013 – 2017 NSF DMS 1440537 Grant: Homological commutative algebra, polyhedral structure, and algebraic geometry
- 2013 AWM–NSF Travel Grant
- 2012 Banff International Research Station, Research in Teams Grant
- 2012 AMS Mathematical Research Communities Collaboration Grant
- 2011 – 2013 AMS–Simons Travel Grant
- 2010 – 2011 NSF OISE 0964985 International Research Fellowship Program Grant  
One of five partially supported by the Office of Multidisciplinary Activities

## Papers

### Refereed publications

- 2023 1. (with C-Y. Jean Chan, Patricia Klein, Laura Felicia Matusevich, Janet Page, Janet Vassilev) Differential operators, retracts, and toric face rings, *Algebra Number Theory* (to appear), 23 pages. [arXiv](#)
- 2022 2. (with María Cruz Fernández Fernández) On the rank of an  $A$ -hypergeometric  $D$ -module versus the normalized volume of  $A$ , *Bulletin of the London Mathematical Society* **54** (2022), no. 1, 182–192. [arXiv](#)
- 2021 3. (with Patricia Klein, Michael C. Loper, Jay Yang) Homological and combinatorial aspects of virtually Cohen–Macaulay sheaves, *Transactions of the London Mathematical Society* **8** (2021), no. 1, 413–434. [arXiv](#)
4. (with C-Y. Jean Chan, Patricia Klein, Laura Felicia Matusevich, Janet Page, Janet Vassilev) An illustrated view of differential operators on quotients of affine semigroup rings, *Women in Commutative Algebra*, 49–94, Women Math. Ser., **29**, Springer, 2021. [arXiv](#)
- 2020 5. (with María Cruz Fernández Fernández) The characteristic cycle and Gevrey solutions of a hypergeometric system, *Algebra Number Theory*, **14** (2020), no. 2, 323–347. [arXiv](#)
6. (with Daniel Erman, Gregory G. Smith) Virtual resolutions for a product of projective spaces, *Alg. Geom.* **7** (4) (2020) 460–481. [arXiv](#)
7. (with Laura Felicia Matusevich, Uli Walther) On normalized Horn systems, *Collect. Math.*, **71** (2), 279–286. [arXiv](#)
- 2019 8. (with Laura Felicia Matusevich, Uli Walther) Torus equivariant  $D$ -modules and hypergeometric systems, *Adv. Math.* **350** (2019), 1226–1266. [arXiv](#)
- 2018 9. (with Jens Forsgård, Laura Felicia Matusevich) On the parametric behavior of  $A$ -hypergeometric series, *Trans. Amer. Math. Soc.* **370** (2018), no. 6, pp. 4089–4109. [arXiv](#)
- 2016 10. (with Jens Forsgård, Laura Felicia Matusevich) Hypergeometric functions for projective toric curves, *Adv. Math.* **300** (2016), 835–867. [arXiv](#)
- 2015 11. (with Laura Felicia Matusevich, Uli Walther) Singularities and holonomicity of binomial  $D$ -modules, *J. Algebra* **439** (2015), 360–372. [arXiv](#)
12. (with Stephen Griffeth, Ezra Miller) Systems of parameters and holonomicity of  $A$ -hypergeometric systems, *Pacific J. Math.* **276-2** (2015), 281–286. [arXiv](#)
- 2014 13. (with Stephen Griffeth, Steven V Sam) Jack polynomials as fractional quantum Hall states and the Betti numbers of the  $(k + 1)$ -equals ideal, *Comm. Math. Phys.* **330** (2014), no. 1, pp. 415–434. [arXiv](#)

14. (with Jens Forsgård, Mikael Passare) Euler–Mellin integrals and  $A$ -hypergeometric functions, *Michigan Math. J.* **63** (2014), no. 1, 101–123. [arXiv](#)
- 2013 15. (with Daniel Erman, Manoj Kummini, Steven V Sam) Tensor complexes: Multilinear free resolutions constructed from higher tensors, *J. European Mathematical Society* **15** (2013), no. 6, 2257–2295. [arXiv](#)
16. (with Daniel Erman, Manoj Kummini) Three flavors of extremal Betti tables, *Commutative Algebra*, 99–121, Springer, New York, 2013. [arXiv](#)
- 2012 17. (with Daniel Erman, Manoj Kummini, Steven V Sam) Poset structures in Boij–Söderberg theory, *International Mathematics Research Notices* (2012), vol. 2012, 5132–5160. [arXiv](#)
18. (with Daniel Erman, Manoj Kummini, Steven V Sam) Shapes of free resolutions over a local ring, *Mathematische Annalen* **354** (2012), no. 3, 939–954. [arXiv](#)
19. (with Jesse Burke, Daniel Erman, Courtney Gibbons) The cone of Betti diagrams over a hypersurface ring of low embedding dimension, *J. Pure Applied Algebra* **216** (2012), no. 10, 2256–2268. [arXiv](#)
- 2011 20. The rank of a hypergeometric system, *Compositio Mathematica* **147** (2011), no. 1, 284–318. [arXiv](#)
- 2010 21. (with Anton Leykin) Algorithms for Bernstein–Sato polynomials and multiplier ideals, *ISSAC 2010: Proceedings of the 2010 International Symposium on Symbolic and Algebraic Computation*, 99–106, ACM, New York, 2010. [arXiv](#)
- 2009 22. (with Laura Felicia Matusevich)  $A$ -graded methods for monomial ideals, *J. Algebra* **322** (2009), 2886–2904. [arXiv](#)

#### Preprints

23. (with María Cruz Fernández Fernández) A sharp bound for hypergeometric rank in dimension three, 8 pages. [arXiv](#)

#### Conference publications (reviewed and/or invited)

- (with Patricia Klein, Michael C. Loper, Jay Yang) Combinatorial aspects of virtually Cohen–Macaulay sheaves, (Proc. FPSAC 2021) *Sém. Lothar. Combin.*, **85B** (2021), Art. 63, 13 pp.
- The geometry of toric syzygies, *The Notices of the AMS*, April 2020. Reprinted April 2022.
- Constructing virtual resolutions, *Mathematisches Forschungsinstitut Oberwolfach (MFO) Report* (2019).
- Free complexes on smooth toric varieties, *MFO Report* **57** (2016).
- (with Frank-Olaf Schreyer) Syzygies, finite length modules, and random curves, *Commutative Algebra and Noncommutative Algebraic Geometry*, Mathematical Sciences Research Institute Publications (2015), Vol. 1, 25–52. [arXiv](#)
- Boij–Söderberg theory and tensor complexes, *MFO Report* **10** (2013), no. 2, pp. 1504–1506.

#### Lecture series, lectures, and presentations

##### Lecture series

- 2024 Sum. Tianjin, China (MSRI Summer School): Combinatorial free resolutions [20 hours]
- 2013–2014 University of Minnesota: Euler–Koszul homology and hypergeometric systems [9 hours]
- 2010 Oct. KTH, Stockholm: Euler–Koszul homology and hypergeometric systems [4 hours]

##### Invited (international audience)

- 2023 Mar Chennai, India: Virtual Commutative Algebra Seminar
- 2021 Aug Virtual: SIAM AG21 Minisymposium in Commutative Algebra

- 2020 June Bucharest, Romania: Homological trends in Commutative Algebra and Algebraic Geometry (Postponed due to COVID-19)
- 2019 Sept. Oberwolfach, Germany (MFO): Toric Geometry  
 Sept. Madison, WI (AMS): Special Session on Hodge Theory in Honor of Donu Arapura
- 2018 June Banff, Canada (BIRS): New trends in syzygies
- 2017 Oct. Edmonton, Canada: Canadian Western Algebraic Geometry Symposium  
 July Berkeley, CA: Macaulay2 Conference/Workshop  
 May Martha's Vineyard, MA: A View Towards Algebraic Geometry  
 Jan. Montréal, Canada: Combinatorial Algebra meets Algebraic Combinatorics
- 2016 Dec. Oberwolfach, Germany (MFO): Asymptotic Phenomena in Local Algebra  
 Oct. Fields Institute, Toronto, ON: Workshop on Convexity in Algebraic Geometry  
 July Herstmonceux Castle, East Sussex, UK: Algebraic Combinatorics and Group Actions  
 Apr. Banff, Canada (BIRS): Free Resolutions, Representations, and Asymptotic Algebra
- 2014 Sept. Levico Terme, Italy: Meeting On Combinatorial Commutative Algebra (MOCCA)  
 June Institut Mittag-Leffler, Djursholm, Sweden: Algebraic Geometry days in honor of Dan Laksov
- 2013 Dec. Hanoi, Vietnam: International Conference on Commutative Algebra and Its Interactions  
 July Utrecht University: Conference on Special Functions and Special Numbers for Frits Beukers  
 May Berlin, Germany: Syzygies in Berlin  
 May Oberwolfach, Germany (MFO): Constructive Homological Algebra  
 Mar. Kleinwalsertal, Austria: Perspectives & Emerging topics in Algebra & Kombinatorics (PEAKs)
- 2012 Dec. Berkeley, CA (MSRI): Combinatorial Commutative Algebra and Applications
- 2011 Dec. Toronto, ON (CMS): Scientific Session on Algebraic Geometry and Commutative Algebra  
 Apr. University of Leiden: Intercity Number Theory Seminar  
 Feb. Institut Mittag-Leffler, Djursholm, Sweden: Algebraic Geometry Program Seminar
- 2010 Oct. Freie Universität, Berlin: Algebra Seminar  
 Sept. KTH and Stockholm University: Algebra and Geometry Seminar  
 Sept. University of Barcelona: Algebra Seminar  
 Sept. Stockholm University: Pluricomplex Seminar  
 June Berkeley, CA (AMS-SMM): Special Session, Commutative Algebra, Representation Theory  
 Jan. Sevilla, Spain: International School of Combinatorics for Pilar Pisón-Casares
- 2007 Sept. Kleinwalsertal, Austria: Summer School on Hypergeometric Functions
- Invited (domestic audience; not including seminars)
- 2023 Aug. University of Nebraska, Lincoln: Departmental Colloquium  
 May University of Oregon: Departmental Colloquium
- 2022 June Minneapolis, MN: AWM Research Symposium Plenary Address  
 Apr. Ames, Iowa: USTARS (Underrepresented Students in Topology and Algebra Research Symposium) Faculty Speaker (Postponed due to COVID-19)  
 Mar. Virtual (AMS): Central Sectional Invited Address
- 2021 Oct. Virtual (AMS): Special Session on Homological Methods in Commutative Algebra  
 May Virtual (AMS): Special Session on Commutative Algebra  
 Mar. Virtual (AMS): Special Session on Commutative Algebra and its Interaction with Algebraic Geometry and Combinatorics
- 2020 Nov. University of Utah: Departmental Colloquium  
 Nov. Virtual: A Hypergeometric Conference  
 Apr. Virtual: CAZoom commutative algebra and related fields
- 2019 Sept. Madison, WI (AMS): Special Session, Combinatorial Algebraic Geometry  
 Feb. Ohio State University: Departmental Colloquium

- Jan. Mathematics Project at Minnesota: Workshop for Female Undergraduates  
 2018 Apr. University of Wisconsin-Madison: Departmental Colloquium  
 Mar. Purdue University: Mathematics Recruitment Weekend Speaker  
 Jan. Mathematics Project at Minnesota: Workshop for Women Undergraduates  
 2017 Nov. Chicago, IL (UIC): Undergraduate Mathematics Symposium  
 Jan. Butler University: Departmental Colloquium  
 2016 June West Lafayette, IN: EDGE Reunion Weekend Plenary Speaker  
 Apr. Minneapolis, MN: Upper Midwest Commutative Algebra Colloquium Expository Lecture  
 Mar. Purdue University: Mathematics Recruitment Weekend Speaker  
 2015 Oct. Chicago, IL (AMS): Special Session, Commutative Algebra  
 Aug. West Lafayette, IN: Midwest Commutative Algebra Meeting  
 Jan. San Antonio, TX (JMM): Special Session, Syzygies  
 2014 Oct. Chicago, IL (AlGeCom): Algebra, Geometry, and Combinatorics Day 11  
 Oct. Moscow, ID (WAGS): Western Algebraic Geometry Symposium  
 Sept. Eau Claire, WI (AMS): Special Session, Directions in Commutative Algebra  
 2013 Oct. Philadelphia, PA (AMS): Special Session, Combinatorial Commutative Algebra  
 Aug. Fort Collins, CO (SIAM): Minisymposium on  $D$ -modules in Applied Algebraic Geometry  
 Aug. Fort Collins, CO (SIAM): Minisymposium on Algebro-geometric approaches to tensor spaces  
 Mar. Purdue University: Mathematics Recruitment Weekend Speaker  
 Jan. University of Illinois, Urbana-Champaign: Departmental Colloquium  
 Jan. North Carolina State University: Special Departmental Seminar  
 Jan. University of Notre Dame: Departmental Colloquium  
 2012 Dec. University of Minnesota: Special Departmental Seminar  
 Apr. Wake Forest University: Departmental Colloquium  
 Mar. Lawrence, KA (AMS): Special Session, Topics in Commutative Algebra  
 2011 Oct. Salt Lake City (AMS): Special Session, Computational & Algorithmic Algebraic Geometry  
 Oct. Raleigh, NC (SIAM): Minisymposium on Combinatorial Structures in Algebraic Statistics  
 Sept. Winston-Salem, NC (AMS): Special Session, Combinatorial Algebraic Geometry  
 Sept. ICERM, Providence, RI (AWM): Special Session, Algebraic Geometry, Commutative Algebra  
 June MSRI: Summer Graduate Workshop in Commutative Algebra  
 Jan. New Orleans, LA (JMM): Special Session, Combinatorial Algebraic Geometry  
 2010 Mar. Butler University: Departmental Colloquium  
 Feb. Sam Houston State University: Departmental Colloquium  
 Jan. San Francisco, CA: Joint Mathematics Meeting, Special Session, Commutative Algebra  
 2009 Apr. Raleigh, NC (AMS): Special Session, Recent Advances in Symbolic Algebra and Analysis  
 2008 Apr. Bloomington, IN (AMS): Special Session,  $D$ -modules

#### Seminars (domestic)

- 2023 Aug. University of Nebraska, Lincoln: Commutative Algebra Seminar  
 2021 Nov. Purdue University: Commutative Algebra Seminar  
 Sept. San Francisco State University: Algebra, Geometry, and Combinatorics Seminar  
 2020 Nov. University of Utah: Commutative Algebra Seminar  
 Nov. University of Utah: AWM-RTG Pathways Talk  
 Apr. Fellowship of the Ring Seminar, a National Commutative Algebra Seminar  
 2019 Dec. University of Minnesota: Introduction to Research Seminar  
 2018 Feb. Purdue University: Working Algebraic Geometry Seminar  
 Jan. University of Minnesota: Combinatorics Seminar  
 2017 Mar. University of Michigan: Commutative Algebra Seminar

- 2016 Oct. University of Minnesota: Introduction to Research Seminar  
 2014 Dec. University of Minnesota: Introduction to Research Seminar  
 Feb. University of Minnesota: Combinatorics Seminar  
 Jan. Texas A&M University: Geometry Seminar  
 2013 Nov. University of Wisconsin: Algebraic Geometry Seminar  
 Oct. University of Minnesota: Introduction to Research Seminar  
 Feb. Duke University: Algebraic Geometry Seminar  
 2012 Nov. San Francisco State University: Algebra, Geometry, and Combinatorics Seminar  
 Nov. Texas A&M University: Geometry Seminar  
 Sept. UC Berkeley: Commutative Algebra and Algebraic Geometry Seminar  
 Apr. North Carolina State University: Algebra and Combinatorics Seminar  
 Apr. University of North Carolina: Geometric Representation Theory Seminar  
 Feb. University of Michigan: Commutative Algebra Seminar  
 Jan. Texas A&M University: Algebra and Combinatorics Seminar  
 2011 Nov. North Carolina State University: Symbolic Computation Seminar  
 Jan. Stanford University: Algebraic Geometry Seminar  
 2010 Mar. Purdue University: Bridge to Research Seminar  
 Feb. University of Nebraska, Lincoln: Commutative Algebra Seminar  
 Feb. University of Nebraska, Lincoln: Mathematical Landscapes Seminar  
 2009 Nov. University of Illinois, Urbana-Champaign: Algebra-Geometry-Combinatorics Seminar  
 Oct. University of Michigan: Commutative Algebra Seminar  
 Sum. Purdue University: Multiplier Ideals Seminar  
 Apr. MSRI: Algebraic Geometry Program Graduate Student Seminar  
 Feb. Purdue University: Student Commutative Algebra Seminar  
 Feb. University of Notre Dame: Algebraic Geometry and Commutative Algebra Seminar  
 2008 Oct. Texas A&M University: Geometry Seminar  
 Oct. Purdue University: Boij–Söderberg Conjectures Seminar  
 Oct. Purdue University: Working Algebraic Geometry Seminar  
 Sum. Purdue University: Characteristic Classes Topology Seminar

#### Poster Presentations

- 2011 June Stockholm: Effective Methods in Algebraic Geometry (MEGA), Invited Poster Session  
 2010 Sept. Barcelona: First Swedish–Catalan Conference in Mathematics  
 Apr. Amherst, MA: Algebraic Geometry Northeastern Series (AGNES)  
 2004 Jan. Phoenix, AZ: Joint Mathematics Meetings, Undergraduate Poster Session  
 2003 Jan. Baltimore, MD: Joint Mathematics Meetings, Undergraduate Poster Session

#### Teaching activities

##### Courses taught at Minnesota

- 2023 Spring Mathematics for Social Justice (Math 4471W)  
 2022 Fall Introduction to Modern Algebra (Math 4281)  
 2022 Spring Undergraduate Topics: Mathematics for Social Justice (Math 5490)  
     Designed new course connecting mathematical modeling and data analysis to social justice in an active learning environment, with scaffolded writing and presentation project; applied for and obtained new course number Math 4471W  
 2021 Spring General Algebra II (Math 8202)  
     Pandemic remote teaching, flipped classroom approach  
 2020 Fall General Algebra I (Math 8201)  
     Pandemic remote teaching, flipped classroom approach

- 2020 Spring Introduction to Modern Algebra (Math 4281)  
Implemented an IBL structure in the course
- 2019 Spring General Algebra II (Math 8202)
- 2018 Fall Topics in Algebra (Math 8300)  
Discriminants, Resultants, and Multidimensional Determinants
- 2018 Fall General Algebra I (Math 8201)
- 2018 Spring Computational Algebraic Geometry (Math 5385)  
Included a scaffolded final paper and presentation project
- 2018 Spring Commutative and Homological Algebra II (Math 8212)  
Included a research paper presentation project
- 2017 Fall Commutative and Homological Algebra I (Math 8211)  
Included a scaffolded final paper project
- 2017 Spring General Algebra II (Math 8202)
- 2016 Fall General Algebra I (Math 8201)
- 2016 Fall Introduction to Modern Algebra (Math 4281)
- 2016 Spring Calculus I (Math 1271)  
Served as course coordinator, overseeing content, TAs, and the writing of a common final
- 2015 Spring Commutative and Homological Algebra II (Math 8212)  
Included a research paper presentation project
- 2014 Fall Commutative and Homological Algebra I (Math 8211)  
Included a scaffolded final paper and presentation project
- 2014 Spring Introduction to Modern Algebra (Math 4281)
- 2013 Fall Introduction to Modern Algebra (Math 4281)

## Teaching enrichment activities at Minnesota

- 2021 Fall Foundations of Inclusive Teaching  
Five two hour discussion and activity-based meetings, each with 90 minutes of pre-assignments, to introduce a flexible framework and bring faculty and instructors from multiple disciplines together to explore applying this framework to their specific teaching contexts. Offered through the UMN Center for Educational Innovation.
- 2021 Aug. ISAI Teaching Activities Bundle  
Two hour webinar focused on a bundle of activities to establish an inclusive classroom community and build rapport. Offered through UMN International Student Academic Integration (ISAI).
- 2021 Jan. ISAI Teaching Activities Webinar: Snowball Review
- 2021 Jan. ISAI Teaching Activities Webinar: Check-in Activities

## Courses taught at Duke

- 2013 Spring Introduction to Algebraic Structures II (Math 502)
- 2012 Spring Abstract algebra (Math 121)
- 2012 Spring Honors multivariable calculus (Math 105)
- 2011 Fall Graduate course on hypergeometric systems (Math 378, 5 weeks)  
Designed course notes based on personal research work
- 2011 Fall Multivariable calculus (Math 103)

## Courses taught at Purdue

- 2008 Fall Second semester business calculus (Math 224), with exam-writing responsibilities
- 2007 Fall First semester business calculus (Math 223), with exam-writing responsibilities
- 2007 Spring Algebra/trigonometry (Math 154)

2006 Fall Single-variable engineering calculus (Math 161E), recitation for at-risk students

#### Other teaching activities

2011 June MSRI Workshop Postdoc TA: Summer Graduate Workshop in Commutative Algebra  
2009 Spring Grader for the undergraduate abstract algebra course, Purdue University  
2003–2004 Butler University Mathematics Tutoring Lab Student Coordinator  
2002–2004 Butler University Mathematics Tutoring Lab Tutor

#### Advising activities

##### Postdoctoral mentor at Minnesota

2021–2024 Michael Perlman, Dunham Jackson Postdoctoral Fellow  
2021–2024 Ayah Almousa, NSF RTG (2021-2022) & President's Postdoctoral Fellow (PPFP)  
2021–2023 Monica Lewis, NSF Postdoctoral Fellow  
2019–2022 Patricia Klein, Dunham Jackson Postdoctoral Fellow  
2018–2021 Jay Yang, NSF RTG Postdoctoral Fellow

##### Graduate student advisor at Minnesota

2021– Eduardo Torres Davila  
2019–2024 Mahrud Sayrafi  
2016–2020 Michael Loper

##### Graduate student initial advisor at Minnesota

2023– Anja Wisniewski  
2022– Lina Liu, Lee Trent  
2021–2023 Tori Braun, Anastasia Nathanson  
2021–2022 Elise Catania  
2019–2022 Tomas Banuelos  
2019–2021 Libby Farrell  
2018–2020 Mahrud Sayrafi, Kayla Wright  
2017–2019 Emily Tibor  
2014–2017 Cora Brown, Sunita Chepuri, Michelle Pinharry

##### Community of Scholars Program graduate student advisor at Minnesota

2018 Lisa Nuguid

##### REU undergraduate students advised at Minnesota

2020 Sum. Preston Cranford, Alan Peng, Vijay Srinivasan  
2019 Sum. CJ Dowd, Feiyang Lin, Nathan Kenshur, Sean McNally, Zixuan Xu, Teresa Yu  
2018 Sum. Johnny Gao, Yutong Li, Amal Mattoo

##### Undergraduate honors thesis students advised at Minnesota

2020 Spring Sean McNally  
2019–2020 Rebecca Rechkin

##### Undergraduate senior project students advised at Minnesota

2021 Spring Kelsey Fahland, Jack Patterson  
2020 Fall Haris Javed, Julia Park, Mingming Xu  
2018 Spring Kexuan Shi  
2017 Spring Waylan Hedine  
2014 Fall Zach Adams, Milton Stephens IV  
2014 Spring Samuel Jirele, Milton Stephens IV, Xuan Wang

##### Undergraduate senior thesis advised at Duke

2011–2012 Danny Thielman

#### Research group organization

- 2022 Virtual (Fields Institute): Women in Commutative Algebra and Algebraic Geometry, research group leader and participant
- 2020 Sum. University of Minnesota: Combinatorics REU Mentor
- 2019 Oct. Banff, Canada (BIRS): Women in Commutative Algebra (WICA) 2019, research group leader with Laura Matusevich
- 2019 Sum. University of Minnesota: Combinatorics REU Coordinator & Mentor
- 2018 Sum. University of Minnesota: Combinatorics REU Mentor
- 2018 Apr. Madison, WI: Macaulay2 Workshop, coding group leader

#### Professional service

##### Diversity and outreach activities

- 2020– Co-founder and organizer for the Roots of Unity workshop  
Designed, secured funding, and organized a workshop to support, mentor, and guide students who identify as women, nonbinary, and/or gender fluid as they begin research at the graduate level. The program is particularly tailored to support students of color, with recruitment and mentoring strategies that reflect this priority (with M. Manes, P. Patel, C. Price, A. Salerno, B. Viray).
- 2022–2025 Nominating committee for Association for Women in Mathematics (AWM)  
Nominate and prepare election documents for the AWM Executive Committee Members.
- 2019–2022 Selection committee for the AWM Michler Prize  
Select recipient for a research stay at Cornell for a mid-career mathematician.
- 2020–2021 Diversity and Inclusion in Hiring Task Force.  
Participant in five person task force charged with researching best practices to incorporate in a hiring procedures design, with the specific goal of hiring and retaining diverse faculty. Discussion and research included: active recruiting from diverse populations, inclusive position advertisements, awareness of unconscious assumptions and implicit bias, fair review of applications, effective interview processes. We developed and documented a set of hiring procedures incorporating best practices, and obtained support from faculty.
- June 2021 EDGE Summer Program local coordinator  
Handled local operations at UMN, including some staffing, housing, room reservations, meals, and other on-the-ground support for a four week program for women about to begin graduate school in mathematics, including courses, problem sessions, and discussion groups. This program is designed to strengthen the ability of women and minority students to successfully complete graduate programs in the mathematical sciences.
- 2020– Western Algebraic Geometry Symposium (WAGS) Diversity Committee  
Review and advise on speaker lists, with an eye towards creating a slate of diverse talks at each WAGS meeting.
- 2018–2019 School of Mathematics Diversity Committee  
Served on inaugural departmental diversity committee; advocated in the department and the College of Science and Engineering for more inclusive and equitable hiring practices, worked towards improving climate for graduate students.
- 2017– MathAlliance Facilitated Graduate Applications Process (F-GAP) mentor  
Provide undergraduate seniors and masters students at non-Ph.D.-granting institutions with the advice and assistance needed to begin the application process as they consider applying to graduate programs. To qualify for the program, students must either come from a racial or ethnic group that is historically marginalized in mathematics or be a first generation college student.

- 2014– Faculty advisor for the UMN Gender Minorities in Mathematics (GeMM) Program (formerly Women in Math, WiM)  
Serves as faculty contact and advisor for the School of Mathematics AWM chapter.
- 2014– Leader of the Minnesota cluster of the EDGE Mentoring Network  
Facilitate regular meetings of and act as lead EDGE mentor for EDGErs in Minnesota and (sometimes) surrounding states.
- 2014– Association for Women in Mathematics (AWM) Mentor Network mentor  
Meet one-on-one with students interested in pursuing a career in mathematics.
- 2014 Aug. Interview for Girls' Angle Bulletin  
Featured interview in an article for a mathematical magazine for girls in grades 5-12.
- 2012–2013 Co-founder and organizer of MATH MENTORING  
Created and launched a scaffolded mentoring program for women in mathematics at Duke University (with C. Cederbaum, B. Cooke, S. Schott).
- 2004–2006 Purdue University Graduate Women in Science Program (WISP) Leadership Team  
Organize programming and events for monthly WISP meetings of women across science and engineering.

#### Additional diversity and outreach activities

- 2021 Nov. Field of Dreams Conference UMN Graduate Student Recruiting
- 2021 Jan. Mathematics Project at Minnesota: Workshop for Female Undergraduates, Panelist
- 2020 Oct. MathAlliance Grad School Fair, Panelist
- 2019 Jan. Mathematics Project at Minnesota: Workshop for Female Undergraduates, Speaker/Panelist
- 2018 Nov. Field of Dreams Conference Panelist: How to Recruit Alliance Students
- 2018 Oct. GROW Conference Panelist: Different Graduate Programs
- 2018 Mar. Purdue University Mathematics Recruitment Weekend Speaker
- 2018 Jan. Mathematics Project at Minnesota: Workshop for Female Undergraduates, Speaker
- 2017 Oct. Field of Dreams Conference Panelist: How to Prepare for your First Academic Position
- 2016 June EDGE Reunion Weekend Plenary Speaker
- 2016 Mar. Purdue University Mathematics Recruitment Weekend Speaker
- 2013 Mar. Purdue University Mathematics Recruitment Weekend Speaker
- 2004– Member of the EDGE Mentoring Network
- 2004–2008 Purdue University Graduate Women in Science Program

#### Graduate student MathAlliance mentor at Minnesota

- 2021– Angel Chavez
- 2019– Dorian Smith
- 2018–2021 Lisa Nuguid
- 2017–2021 Drisana Mosaphir, Cecily Santiago

#### Organizing activities for conferences and meetings

- 2015– Universities of Minnesota and Wisconsin, Iowa State: CA+, an annual weekend meeting in algebra (with D. Erman, J. McCullough; previously with S. Sam)
- 2024 Jan \*Berkeley, MN: Connections in Commutative Algebra
- 2023 Aug \*Pasadena, CA (AIM): Roots of Unity Research Symposium (with M. Manes, P. Patel, C. Price, A. Salerno, B. Viray)
- 2023 June Minneapolis, MN: Macaulay2 Conference (with A. Almousa, M. Perlman, M. Sayrafi)
- 2022 June \*Minneapolis, MN (AWM): Minisymposium, Homological and Combinatorial Aspects of Commutative Algebra (with P. Klein)

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\*Specifically aimed at increasing diversity, equity, and inclusion.

- June \*Minneapolis, MN: Roots of Unity Workshop (with M. Manes, P. Patel, C. Price, A. Salerno, B. Viray)
- May Minneapolis, MN: Open Problems in Combinatorics and Algebra (OPAC) 2020 (with B. Brubaker, G. Musiker, P. Pylyavskyy, V. Reiner) (Postponed from 2020 due to COVID-19)
- May Minneapolis, MN: Graduate Meeting on Combinatorial Commutative Algebra (Grad MoCCA), a weekend workshop to build graduate student community and collaborations (with C. Booms, M. Sayrafi, C. Simpson)
- Apr. West Lafayette, IN (AMS): Special Session, Combinatorial Algebra and Geometry (with L. Matusevich, A. Sobieska), West Lafayette, IN
- 2021 Aug Providence, RI (ICERM): Computational aspects of singularities via  $D$ -modules (with L. Ma, C. Miller, C. Raicu, U. Walther)
- 2019 July Institute for Mathematics and its Applications (IMA): Joint Sage/Macaulay2 coding conference (with A. Leykin, G. Musiker, A. Schilling)
- Apr. \*Minneapolis, MN: Graduate Workshop in Commutative Algebra for women and other mathematicians of a minority gender (with J. Bruce, P. Klein)
- Apr. \*Houston, TX (AWM): Special session, Combinatorial algebra (with L. Matusevich)
- Jan. Institute for Mathematics and its Applications (IMA): Macaulay2 coding sprints (with A. Leykin)
- 2017 Aug. Minneapolis, MN: Local cohomology in commutative algebra and algebraic geometry (with U. Walther, W. Zhang)
- 2014 Sept. Eau Claire, WI (AMS): Special session, New trends in toric geometry (with D. Erman, H. Schenck)
- 2012 Mar. \*Durham, NC: North Carolina EDGE Mentoring Network Day
- Feb. Durham, NC: Triangle Lectures in Combinatorics (with E. Miller, S. Mapes)
- 2011 Oct. Salt Lake City, UT (AMS): Special session, Hypergeometric functions and differential equations (with L. Matusevich)
- Jan. New Orleans, LA (JMM): Special session, Commutative Algebra (MRC) (with B. Bhatt, J. McCullough, J. Validashti)

## Journals edited

- 2021– La Matematica
- 2017– J. of Software for Algebra and Geometry (JSAG), Managing editor (2023– )

## Journals refereed

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| Advances in Mathematics                      | Algebra Number Theory                      |
| Communications in Algebra                    | Compositio Mathematica                     |
| Funkcialaj Ekvacioj. Serio Internacia        | International Mathematics Research Notices |
| J. of Combinatorial Theory, Series A         | J. of Commutative Algebra                  |
| J. of Mathematical Analysis and Applications | J. of Pure and Applied Algebra             |
| J. of Software for Algebra and Geometry      | J. of Symbolic Computation                 |
| J. of the European Mathematical Society      | London Mathematical Society Lecture Notes  |
| Mathematics of Computation                   | Proceedings of the AMS                     |
| Revista Matemática Iberoamericana            | Rocky Mountain J. of Mathematics           |
| Mathematische Zeitschrift                    |  |

## Professional memberships

- AMS (since 2004)    AWM (since 2006)    MAA (since 2010)    NAM (since 2020)
- SI(AG)<sup>2</sup>: SIAM Activity Group in Algebraic Geometry (since 2010)

## Professional Organization Committees

- 2023–2026 AMS Council, Member-at-Large (incl. Committee on Education)
- 2023–2026 AWM Nominating Committee
- 2019–2022 AWM Michler Prize Committee

## College of Science and Engineering Committees at Minnesota

- 2021–2024 CSE Consultative Committee

## School of Mathematics Committees at Minnesota

- 2022–2023 Dunham Jackson Postdoc Search
- 2022 Writing-Enriched Curriculum (WEC) Rating of Student Writing
- 2021–2022 Graduate Studies Task Force
- 2020–2022 Undergraduate Advising
- 2014–2021 Graduate Studies
- 2020 Head Search
- 2020 Hiring Procedures Task Force
- 2019–2020 External Review Response
- 2019–2020 Diversity
- 2017–2019 Dunham Jackson Postdoc Search
- 2016–2017 Strategic Planning
- 2015–2017 Computer
- 2014–2015 Newsletter
- 2013–2014 Undergraduate Programs

## Graduate dissertation committees outside Minnesota

- 2021 Carlo Verschoor, Utrecht University, Netherlands

## Graduate dissertation committees at Minnesota

- 2023 McCleary Philbin
- 2022 Claire Frechette
- 2021 Esther Banaian, Elizabeth Kelley, Katherine Maxwell, Katherine Weber
- 2020 Michael Loper, Gregory Michel, Nadia Ott, Michelle Pinharry
- 2019 Jimmy Broomfield, Daniel Diroff, Peyman Ghahremani
- 2018 Nicole Bridgland
- 2016 Emily Gunawan, Heidi Goodson
- 2014 Alex Csar

## Graduate oral exam committees at Minnesota

- 2023 Anastasia Nathanson
- 2021 Sasha Pevzner, Mahrud Sayrafi
- 2020 McCleary Philbin
- 2019 Ryan Coopergard, Claire Frechette, Hailee Peck, Matthew Sikkink Johnson, Katherine Weber
- 2018 Jorin Schug, Esther Banaian, Galen Dorpalen-Barry, Eric Stucky, Michelle Pinharry, Nadia Ott, Michael Loper
- 2017 Jimmy Broomfield
- 2016 Nicole Bridgland, Daniel Hess, Shelley Kandola
- 2014 Shannon Negaard, Heidi Goodson

## Undergraduate honors thesis committees at Minnesota

- 2022 Annika Christiansen

## Committees at Purdue

- 2007–2009 College of Science Grade Appeals Committee

- 2006–2007 Graduate Student Representative to the Department of Mathematics
- 2004–2006 Graduate Women in Science Program Leadership Team

## Committees at Butler

- 2003–2004 College of Liberal Arts and Sciences Dean’s Student Advisory Committee

## Seminars organized

- 2021– Fellowship of the Ring (International, virtual)
- 2013– Commutative Algebra Seminar (Minnesota)
- 2012 Fall Commutative Algebra Program Postdoc Seminar (MSRI)
- 2010 Fall Pluricomplex Seminar (Stockholm University)
- 2009 Sum. Multiplier Ideals Seminar (Purdue)
- 2008 Fall Boij–Söderberg Theory Seminar (Purdue)

## Invited participation at conferences and research experiences

- 2023 Jan. Luminy, France (CIRM): Written Geometry: Commutative Algebra
- 2022 Mar. Oberwolfach, Germany (MFO): Workshop on Toric Geometry
- 2019 Sept. Oberwolfach, Germany (MFO): Workshop on Toric Geometry
- 2017 May Ann Arbor, MI: Mentoring Workshop for Graduate Advisors in Mathematics
- 2012 Aug. Banff, Canada (BIRS): Syzygies in Algebraic Geometry, with an exploration of a connection with String Theory
- 2010 June Snowbird, UT: AMS Mathematical Research Communities: Commutative Algebra
- 2009 Oct. Palo Alto, CA (AIM): Macaulay2 Conference, Implementing algebraic geometry algorithms (invited participant and developer)
- 2008 June Snowbird, UT: AMS Mathematical Research Communities: Computational Algebra and Convexity,
- 2004 June Atlanta, GA (Spelman): The EDGE Program for women and minorities entering graduate school in mathematics
- 2003 Sum. Indianapolis, IN: Butler Summer Institute Research Program (Mentor: Prem Sharma)
- 2002 Sum. Mount Pleasant, MI: NSF REU, Central Michigan University (Mentor: Ken W. Smith)