

# Martin Helmer

Assistant Professor.

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📍 Martin-Helmer

## Summary of Mathematical Interests

My research focuses on computational and theoretical techniques to aid in understanding algebraic geometry and its applications. This includes practical methods in intersection theory and singularity theory, real and combinatorial algebraic geometry, methods which bridge between algebraic geometry and topological data analysis, and interactions between algebraic geometry and other areas of mathematics and science. My research program is interdisciplinary and involves pure and applied aspects with an emphasis on the development of novel conceptual insights which enable effective computational techniques and give yield solutions to problems arising in the sciences and engineering.

## Academic Positions

- 2022 – Present **Assistant Professor**, *Department of Mathematics*, North Carolina State University.
- 2019 – 2021 **MSI Fellow**, *Mathematical Sciences Institute*, Australian National University.
- 2017–2019 **Postdoctoral Fellow**, *Department of Mathematical Sciences*, University of Copenhagen.
  - Postdoc Mentor: Elisenda Feliu
- 2015–2017 **NSERC Postdoctoral Fellow and Visiting Assistant Professor**, *Department of Mathematics*, University of California, Berkeley.
  - Postdoc Mentor: Bernd Sturmfels

## Research Grant Funding and Awards

- 2022–2027 **AFOSR (Air Force Office of Scientific Research) Research Grant**, joint with Vedit Nanda.
  - Title: *Stratified Invariants for Kinematic Singularities*
  - Value (US Dollars): **\$897,654.00**
- 2021–2022 **MATRIX Workshop Grant**, joint with Cordian Riener, Vera Roshchina, and James Saunderson.
  - Title: *Convexity, Geometry and Computation*. Value: \$6000 plus food & accommodation for 20 participants.
- 2015–2017 **NSERC (Natural Sciences and Engineering Research Council of Canada) Postdoctoral Fellowship**.
  - Value (Canadian Dollars): **\$90,000.00**
- 2016 **AMS Travel award for the MRC Workshop on Algebraic Statistics**.

## Preprints

23. Martin Helmer and Vedit Nanda. Effective Whitney Stratification of Real Algebraic Varieties . Arxiv: 2307.05427. 2023.

## Publications

- 22. Christoph Dlapa, Martin Helmer, Georgios Papathanasiou, Felix Tellander. Symbol Alphabets from the Landau Singular Locus. To appear in the *Journal of High Energy Physics*, accepted for publication Aug. 2023.
- 21. Martin Helmer and Elias Tsigaridas. Segre-Driven Radicality Testing. *Journal of Symbolic Computation*, DOI: 10.1016/j.jsc.2023.102262, 2023.
- 20. Martin Helmer and Vedit Nanda. Complex Links and Hilbert-Samuel Multiplicities. *SIAM Journal on Applied Algebra and Geometry*, DOI: 10.1137/22M1475533, 2023.
- 19. Martin Helmer and Felix Tellander. Cohen-Macaulay Property of Feynman Integrals. *Communications in Mathematical Physics*, DOI: 10.1007/s00220-022-04569-6, 2022.
- 18. Martin Helmer and Vedit Nanda. Conormal Spaces and Whitney Stratifications. *Foundations of Computational Mathematics*, DOI: 10.1007/s10208-022-09574-8, 2022.

17. Yacin Ameur, Martin Helmer, Felix Tellander. On the Uniqueness Problem for Quadrature Domains. *Computational Methods and Function Theory*, DOI: 10.1007/s40315-021-00373-w, 2021.
16. Michael F Adamer, Martin Helmer. Families of toric chemical reaction networks. *Journal of Mathematical Chemistry*, DOI: 10.1007/s10910-020-01162-x, 2020.
15. Jonathan D. Hauenstein, Martin Helmer. Probabilistic Saturations and Alt's Problem. *Journal of Experimental Mathematics*, DOI: 10.1080/10586458.2020.1740835, 2020.
14. Corey Harris and Martin Helmer. Segre Class Computation and Practical Applications. *Mathematics of Computation*, 89, 465-491, 2020. DOI: 10.1090/mcom/3448.
13. James Fullwood and Martin Helmer. On the Euler characteristic of a relative hypersurface. *Journal of Mathematical Physics*, 60, 052302, 2019.
12. Michael F. Adamer, Martin Helmer. Complexity of Model Testing for Dynamical Systems with Toric Steady States. *Advances in Applied Mathematics*, Volume 110, September 2019, Pages 42-75.
11. Elisenda Feliu and Martin Helmer. Multistationarity and Bistability for Fewnomial Chemical Reaction Networks. *Bulletin of Mathematical Biology*, 81:1089–1121, 2019. DOI: 10.1007/s11538-018-00555-z.
10. Martin Helmer, Bernt Ivar Utstøl Nødland. Polar degrees and Closest Points in Codimension Two. *Journal of Algebra and Its Applications*, 1950095, 2018.
9. Martin Helmer and Bernd Sturmfels. Nearest Points on Toric Varieties. *Mathematica Scandinavica*, Volume 122.2, Pages 213-238, 2018.
8. Carlos Améndola, Nathan Bliss, Isaac Burke, Courtney R. Gibbons, Martin Helmer, Serkan Hoşten, Evan D. Nash, Jose Israel Rodriguez, Daniel Smolkin. The Maximum Likelihood Degree of Toric Varieties. *Journal of Symbolic Computation*, 2018.
7. Martin Helmer. Computing Characteristic Classes of Subschemes of Smooth Toric Varieties. *Journal of Algebra*, Volume 476, Pages 548-582, ISSN 0021-8693, 2017.
6. Martin Helmer (with Appendix by Martin Helmer and Éric Schost). A Direct Algorithm to Compute the Topological Euler Characteristic and Chern-Schwartz-MacPherson Class of Projective Complete Intersection Varieties. *Theoretical Computer Science*, Volume 681, Pages 54-74, ISSN 0304-3975, 2017.
5. Martin Helmer. Computing the Chern-Schwartz-MacPherson Class of Complete Simplicial Toric Varieties. *Springer Proceedings in Mathematics & Statistics book series (PROMS)*, Volume 198 (ACA 2015), Pages 207-217, July 2017.
4. Martin Helmer. Algorithms to Compute the Topological Euler Characteristic, Chern-Schwartz-Macpherson class and Segre Class of Projective Varieties. *Journal of Symbolic Computation*, 73, Pages 120-138, 2016.
3. Martin Helmer. An Algorithm to Compute Certain Euler Characteristics and Chern-Schwartz-MacPherson classes. Proceedings of the 2014 Symposium on Symbolic-Numeric Computation, Pages 130-131. ACM, 2014.
2. P.L. Buono, Martin Helmer, and Jeroen SW Lamb. On the Zero Set of G-equivariant Maps. *Mathematical Proceedings of the Cambridge Phil. Soc.*, Volume 147. Cambridge Univ. Press, 2009.
1. Ramiro Liscano, John Khalil Jacoub, Anand Dersingh, Jinfu Zheng, Martin Helmer, Charles Elliott, and Ali Najafizadeh. Network Performance of a Wireless Sensor Network for Temperature Monitoring in Vineyards. In Proceedings of the 8th ACM Symposium on Performance evaluation of wireless ad hoc, sensor, and ubiquitous networks, Pages 125-130. ACM, 2011.

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## Long Term Research Visits (3 months or more)

- Upcoming: **Visiting Professor**, *Newton Institute*, University of Cambridge, Cambridge, United Kingdom.  
Jan.–July, 2024
- April–July, 2023 **Visiting Professor**, *Mathematics Institute*, University of Oxford, Oxford, United Kingdom.

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## Education

- 2011–2015 **Ph.D Applied Mathematics**, *University of Western Ontario*, Canada.  
◦ PhD awarded October 2015.  
◦ Advisor: Éric Schost  
◦ Thesis: Algorithms to Compute Characteristic Classes of Projective Schemes: <https://ir.lib.uwo.ca/etd/2923/>
- 2009–2011 **M.Sc Mathematics**, *Queen's University*, Canada.
- 2005–2009 **B.Sc Applied Mathematics**, *University of Ontario Institute of Technology*, Canada.

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## Software

- 2021–2023 **WhitneyStratifications**, a Macaulay2 software package which computes Whitney stratifications of real and complex algebraic varieties.  
<http://www2.macaulay2.com/Macaulay2/doc/Macaulay2-1.21/share/doc/Macaulay2/WhitneyStratifications/html/index.html>
- 2023 **Msolve M2 Interface**, a Macaulay2 software package which provides an interface to the advanced Gröbner basis algorithms in the msolve C package developed by Jérémy Berthomieu, Christian Eder, & Mohab Safey El Din (<https://msolve.lip6.fr/>); the goal is to make these more accessible to the M2 community.  
<https://github.com/Martin-Helmer/MsolveM2Interface>
- 2018 **SegreClasses**, a Macaulay2 software package which tests containment of varieties and computes algebraic multiplicity using new Segre-driven methods. The package also computes Fulton-MacPherson intersection products and Segre classes of subschemes of products of projective spaces.  
<https://faculty.math.illinois.edu/Macaulay2/doc/Macaulay2-1.19/share/doc/Macaulay2/SegreClasses/html/index.html>
- 2018 **ToricInvariants**, A Macaulay2 software package to compute the Euclidean Distance Degree, the polar degrees, and the Chern-Mather class of a projective toric variety using combinatorial methods.  
<https://faculty.math.illinois.edu/Macaulay2/doc/Macaulay2-1.19/share/doc/Macaulay2/ToricInvariants/html/index.html>
- 2017 **EDPolytopeCD2**, a Macaulay2 software package to compute the Euclidean distance and polar degrees of a projective toric variety using combinatorial methods with improved performance in codimension two.  
[http://martin-helmer.com/Software/toricED\\_Codim2.html](http://martin-helmer.com/Software/toricED_Codim2.html)
- 2016 **EDPolytope**, a Macaulay2 software package to compute the Euclidean distance degree and polar degrees of a projective toric variety using combinatorial methods.  
<http://martin-helmer.com/Software/toricED.html>
- 2015 **CharacteristicClasses**, with *Christine Jost*, a Macaulay2 built-in software package. Computes the Segre class, Chern-Schwartz-MacPherson class and Euler characteristic of a given subscheme of certain smooth toric varieties.  
<http://www.math.uiuc.edu/Macaulay2/doc/Macaulay2-1.19/share/doc/Macaulay2/CharacteristicClasses/html/>
- 2014 **char-class-calc**, a Sage program to compute the Segre class, Chern-Schwartz-MacPherson class and Euler characteristic of a projective variety.  
<https://github.com/Martin-Helmer/char-class-calc>

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## PhD Students Supervised

- 2022–Present **Kevin Joy**.  
**Department of Mathematics, North Carolina State University.**
- 2019–2020 **Abhishek Bhardwaj**.  
**Mathematical Sciences Institute, Australian National University.**

- Thesis Title: *Truncated Moment Problems & Non-negative Polynomials*
- After PhD went on to a postdoc position with Victor Magron at LAAS-CNRS in Toulouse, France.

## Honours Students Supervised

- 2021 **Aymon Wuolanne.**  
**Mathematical Sciences Institute, Australian National University.**
- Project: *Multivariate Public Key Cryptography*
- 2020 **Willam Cashman.**  
**Mathematical Sciences Institute, Australian National University.**
- Project: *Effective Algorithms for Polynomial Multiplication*
- 2020 **Adam Onus, co-supervised with Vanessa Robins.**  
**Mathematical Sciences Institute, Australian National University.**
- Project: *Persistent Homology of Periodic Cell Complexes*
- 2019 **Clark Suwidjaja, co-supervised with Markus Hegland.**  
**Mathematical Sciences Institute, Australian National University.**
- Project: *Polynomial Homotopy Continuation*
- 2017 **Siqi Zou.**  
**Department of Mathematics, University of California, Berkeley.**
- Thesis Title: *Gröbner Basis Algorithms for Sudoku Solving*

## Summer Research Students Supervised

- 2019 **Zitao Wang, co-supervised with Markus Hegland.**  
**Mathematical Sciences Institute, Australian National University.**
- Project: *Whitney Stratifications of Algebraic Varieties*

## Teaching Experience

- 2022–Present **Assistant Professor.**  
**Department of Mathematics, North Carolina State University**
- Fall 2023:
    - MA 522: Computer Algebra I. This is a graduate level course introducing students to fundamental techniques in computational algebra and applications.
  - Fall 2022:
    - MA 591: Toric Varieties and Combinatorial Algebraic Geometry. This is a graduate level special topics course.
  - Spring 2022:
    - MA726: Algebraic Geometry. This is a graduate level course introducing students to the fundamentals of algebraic geometry.
- 2020–2021 **MSI Fellow.**  
**Mathematical Sciences Institute, Australian National University.**
- Semester 2 2021, August – November 2021:
    - MATH1014: Mathematics and Applications 2. This is a large first year undergraduate course (400 students) divided into separate calculus and linear algebra parts. I am the course convener, i.e. the primary instructor, and I lecture the linear algebra portion which covers topics such as: vector spaces, linear independence, bases and dimension, eigenvalues and eigenvectors, and orthogonality and least squares.

- Semester 1 2021, February – June 2021:
  - MATH3349/MATH4349/MATH6209 (Special Topics in Math): Toric Varieties and Combinatorial Methods in Algebraic Geometry. This is a cross listed course for upper level undergraduate and masters students. It introduces students to toric varieties and combinatorial algebraic geometry.
    - Course Homepage: <http://martin-helmer.com/Teaching/toric-varieties.html>
- Semester 1 2020, February – June 2020:
  - MATH1014: Mathematics and Applications 2.
  - MATH3349/MATH4349/MATH6209 (Special Topics in Math): Computational Algebraic Geometry. This is a cross listed course for upper level undergraduate and masters students. It introduces students to basic concepts in computational algebraic geometry. This course was co-taught with Markus Hegland, and I was the primary instructor.
    - Course Homepage: <http://martin-helmer.com/Teaching/comp-alg-geo.html>

2018–2019 **Postdoctoral Fellow.**

**Department of Mathematical Sciences, University of Copenhagen.**

- Block 3, February – April 2019:
  - NMAK14009U: Commutative Algebra (KomAlg). This was a graduate course co-taught with Lars Halvard Halle. I was responsible for the lectures, Lars designed the course and we followed his notes.
- Block 2, November 2018 – February 2019:
  - NMAK18009U: Topics in Mathematical Logic. This was a graduate course; I was responsible for the exercise classes only.

2016–2017 **Visiting Assistant Professor (Course Responsible Instructor).**

**Department of Mathematics, University of California, Berkeley.**

- Spring Semester 2017:
  - Math 113: Introduction to Abstract Algebra
    - Course Homepage: [https://math.berkeley.edu/~mhelmer/Teaching/math113\\_2017](https://math.berkeley.edu/~mhelmer/Teaching/math113_2017)
- Fall Semester 2016:
  - Math 143: Elementary Algebraic Geometry
    - Course Homepage: <https://math.berkeley.edu/~mhelmer/Teaching/math143>
- Spring Semester 2016:
  - Math 113: Introduction to Abstract Algebra
    - Course Homepage: <https://math.berkeley.edu/~mhelmer/Teaching/math113>

2012–2015 **Teaching Assistant.**

**Department of Applied Mathematics, University of Western Ontario.**

- Tutorials for AM2415: Applied Mathematical Methods for Electrical and Software Engineering I
- Tutorials for AM2413: Applied Mathematical and Numerical Methods for Mechanical Engineering
- Tutorials for AM1413: Applied Mathematics for Engineers I
- Tutorials for AM1411: Linear Algebra for Engineers

2011 **Math Education Researcher.**

**Department of Mathematics and Statistics, Queens University, Kingston, Canada.**

- Researched the effective use of electronic learning resources in the undergraduate calculus curriculum. Supervised by Peter Taylor.

2011 **Teaching Assistant.**

**Department of Mathematics and Statistics, Queens University, Kingston, Canada.**

- Tutorials for Math 224: Applied Mathematics for Civil Engineers

## Conference Talks

*Upcoming:* **Joint Math Meetings: Topological and Algebraic Approaches for Optimization, AMS Special Session, San Francisco, USA.**  
Jan., 2024

*Upcoming:* **Plenary Lecture: Workshop on Geometry of Polynomial System Solving, Optimization & Topology, Institut Henri Poincaré, Paris, France.**  
October, 2023

- July 12, 2023 **SIAM Conference on Applied Algebraic Geometry**, *Eindhoven, Netherlands*.  
Conormal Spaces and Whitney Stratifications
- June 15, 2023 **Geometry, Topology and Control System Design**, *Banff International Research Station, Banff, Canada*.  
Whitney Stratification of Algebraic Maps and Applications to Kinematic Singularities
- Dec 9, 2021 **AustMS: Topology Session**, *University of Melbourne, Melbourne, Australia*.  
Conormal Spaces and Whitney Stratifications
- Nov 23, 2021 **Workshop on the Intersections of Computation and Optimisation**, *Australian National University, Canberra, Australia*.  
Conormal Spaces and Whitney Stratifications
- June, 2020 **Foundations of Computational Mathematics (FoCM) Conference**, *Simon Fraser University, Downtown Vancouver campus*.  
Conference Canceled due to Covid-19
- Dec 6, 2019 **AustMS: Topology Session**, *Monash University, Melbourne, Australia*.  
Complex Linking Numbers for Strata of Varieties
- Dec 4, 2019 **AustMS: Computational Mathematics Session**, *Monash University, Melbourne, Australia*.  
Probabilistic Saturations and Alt's Problem in Mechanism Design
- Nov 6, 2019 **Workshop on Geometry and Optimization**, *UNSW, Sydney, Australia*.  
Segre-Driven Containment Testing and Multiplicity Computation for Varieties
- Sept 6, 2019 **Challenges in High Performance Computing**, *Australian National University, Canberra, Australia*.  
Probabilistic Saturations and Alt's Problem in Mechanism Design
- July 13, 2019 **SIAM Conference on Applied Algebraic Geometry**, *Bern, Switzerland*.  
Segre-driven ideal membership testing
- Sept 18, 2018 **Core Computational Methods in Nonlinear Algebra at ICERM**, *Brown University, Providence, USA*.  
Segre-driven methods to compute algebraic multiplicity and test ideal membership
- Dec 12, 2017 **Open Source Computer Algebra Research Conference at the Max Planck Institute for Mathematics in the Sciences**, *Leipzig, Germany*.  
Effective Intersection Theory
- Aug 3, 2017 **SIAM Conference on Applied Algebraic Geometry**, *Atlanta, USA*.  
Nearest Points on Toric Varieties
- Jan 5, 2017 **Joint Math Meetings: Algebraic Statistics Special Session**, *Atlanta, USA*.  
Topological Invariants and the Maximum Likelihood Degree of a Toric Variety
- Dec 7, 2015 **Fields Institute Thematic Program on Computer Algebra: Workshop on Algebra, Geometry and Proofs in Symbolic Computation**, *Toronto, Canada*.  
Algorithms to Compute Characteristic Classes of Subschemes of Certain Toric Varieties
- Aug 3, 2015 **SIAM Conference on Applied Algebraic Geometry**, *Daejeon, South Korea*.  
Algorithms for the Computation of Chern-Schwartz-MacPherson Classes and the Euler Characteristic
- July 22, 2015 **Applications of Computer Algebra Conference (ACA) 2015**, *Kalamata, Greece*.  
Algorithms to Compute Chern-Schwartz-Macpherson and Segre Classes and the Euler Characteristic
- July 30, 2014 **Symbolic-Numeric Computation Conference (SNC) 2014**, *Shanghai, China*.  
An Algorithm to Compute Certain Euler Characteristics and Chern-Schwartz-MacPherson Classes
- July 9, 2014 **Applications of Computer Algebra Conference (ACA) 2014**, *Bronx, New York, USA*.  
Algorithms to Compute Chern-Schwartz-Macpherson and Segre Classes and the Euler Characteristic

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## Seminars and Colloquia

- May 12, 2023 **Applied Topology Seminar**, *University of Oxford, Oxford, United Kingdom*.  
The Cohen-Macaulay Property and Feynman Integrals
- Jan 26, 2023 **Optimization, Algebra, and Geometry Seminar**, *Carnegie Mellon University, Pittsburgh, PA, USA*.  
Conormal Spaces and Whitney Stratifications



- Oct 21, 2022 **Algebra Seminar**, *Lehigh University*, Bethlehem, PA, USA.  
Cohen-Macaulay Property and Feynman Integrals
- July 21, 2020 **Pure Math Seminar**, *UNSW*, Sydney, Australia.  
Complex Links and Algebraic Multiplicities
- Sept 23, 2019 **Geometry and Topology Seminar**, *University of Sydney*, Sydney, Australia.  
Segre-Driven Containment Testing for Varieties
- Sept 23, 2019 **Computational Mathematics Seminar**, *Australian National University*, Canberra, Australia.  
Probabilistic Saturations and Alt's Problem in Mechanism Design
- July 30, 2019 **Algebra and Topology Seminar**, *Australian National University*, Canberra, Australia.  
Segre-Driven Containment Testing for Varieties
- Oct 3, 2018 **Department Colloquium**, *Lund University*, Lund, Sweden.  
New Methods in Effective Algebraic Geometry
- March 20, 2018 **Department Colloquium**, *University of New Brunswick*, Fredericton, Canada.  
Effective Algebraic Geometry
- Jan 13, 2017 **Algebra and Number Theory seminar**, *University of California*, Santa Cruz, USA.  
Nearest Points on Toric Varieties
- Sept 28, 2016 **Algebra, Geometry, and Number Theory seminar**, *University of Saskatchewan*, Saskatoon, Canada.  
Nearest Points on Toric Varieties
- Feb 24, 2016 **Algebraic Statistics Seminar**, *Illinois Institute of Technology*, Chicago, USA.  
Finding Nearest Points on Toric Varieties
- Feb 24, 2016 **Algebraic Geometry Seminar**, *University of Chicago*.  
Algorithms to Compute Characteristic Classes of Subschemes of Certain Toric Varieties
- Nov 27, 2015 **Geometry Seminar**, *University of Hong Kong*.  
Algorithms to Compute Characteristic Classes of Subschemes of Certain Toric Varieties
- Nov 18, 2015 **Algebra-Geometry-Combinatorics Seminar**, *San Francisco State University*.  
Algorithms to Compute Characteristic Classes of Subschemes of Certain Toric Varieties
- Nov 10, 2015 **Commutative Algebra and Algebraic Geometry Seminar**, *University of California, Berkeley*.  
Algorithms to Compute Chern-Schwartz-Macpherson Classes
- Sept 21, 2015 **Applied Algebra Seminar**, *University of California, Berkeley*.  
Algorithms to Compute Topological Invariants of Subschemes of Smooth Toric Varieties
- Mar 16, 2015 **Geometry and Topology Seminar**, *University of Western Ontario*.  
Algorithms to Compute Chern-Schwartz-Macpherson and Segre Classes and the Euler Characteristic
- Feb 9, 2015 **Queen's Algebraic Geometry Seminar**, *Queen's University*, Kingston.  
Algorithms to Compute Chern-Schwartz-Macpherson Classes
- June 27, 2014 **LIP6 - Université Paris 6, PoSys Seminar**, *Université Pierre-et-Marie-Curie*, Paris.  
Algorithms to Compute Chern-Schwartz-MacPherson and Segre Classes and the Euler Characteristic

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## Departmental Service and Outreach

- 2023–Present **Diversity, Equity, and Inclusion Committee Member**, Department of Mathematics, NC State.
- 2023–Present **Computing Committee Member**, Department of Mathematics, NC State.
- 2022–Present **Organizer**, *Symbolic Computation Seminar*, Department of Mathematics, NC State.
- 2022–Present **Graduate Program Committee Member**, Department of Mathematics, NC State.
- 2022 **Hiring Committee Member**, *Pure Mathematics Tenure Track Faculty Search*, Department of Mathematics, NC State.
- 2020–2021 **MSI Equity and Diversity Committee Member**, MSI, ANU.
- 2020–2021 **MSI Technology Committee Member**, MSI, ANU.
- 2019–2021 **Co-organizer**, with *Jan Rozendaal*, Department Colloquium, MSI, ANU.
- 2019–2021 **Co-organizer**, with *Martina Rovelli*, Algebra and Topology Seminar, MSI, ANU.

- 2020 **Presenter, ANU Virtual Open Week Outreach Event.**
- 2020 **Contributor, ANU Co-Lab Capture the Flag Outreach Event.**
- 2016 **Co-organizer, with David Dynerman, Berkeley Applied Algebra Seminar.**

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## Service to the Community

- 2022–2024 **Local Arrangements Committee Chair, 49<sup>th</sup> Annual International Symposium on Symbolic and Algebraic Computation (ISSAC), 2024.**
- 2022–2024 **Co-organizer, with Vidit Nanda, Yusra Naqvi, and Anna Seigal, Workshop on applied and computational algebraic geometry, part of the program on new equivariant methods in algebraic and differential geometry. Newton Institute, University of Cambridge, United Kingdom.**
- 2023 **Referee, *Journal of Symbolic Computation*.**
- 2023 **Referee, *Foundations of Computational Mathematics*.**
- 2022 **Referee, *Compositio Mathematica*.**
- 2022 **Referee, *Letters in Mathematical Physics*.**
- 2022 **Referee, *Algebraic Statistics*.**
- 2022 **Referee, *Journal of Pure and Applied Algebra*.**
- 2020–2021 **Referee, *Advances in Applied Mathematics*.**
- 2020 **Referee, *Journal of Topology*.**
- 2019 **Referee, *Journal of Algebraic Statistics*.**
- 2019 **Referee, *Forum of Mathematics, Sigma*.**
- 2019 **Referee, *Compositio Mathematica*.**
- 2018–2019 **Organizer, Minisymposium on Intersections in Practice.  
2019 SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland**
- 2016–2017 **Co-organizer, with Corey Harris, Minisymposium on Euclidean Distance Degree.  
2017 SIAM Conference on Applied Algebraic Geometry, Atlanta, Georgia, USA**
- 2017 **Grant Proposal Referee, *European Research Council*.**
- 2016 **Referee, *Transactions of the AMS (American Mathematical Society)*.**
- 2015 **Referee, *Sixth International Conference on Mathematical Aspects of Computer and Information Sciences (MACIS)*.**