

# Pedram Hekmati

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## Research Interests

Gauge theoretic moduli spaces, character varieties, gerbes,  $K$ -theory, Floer homology, knot theory, vertex operator algebras, generalized geometry and topological  $T$ -duality.

## Employment

- 2016 – University of Auckland, New Zealand  
Senior Lecturer in Mathematics
- 2015 – 2017 Instituto Nacional de Matemática Pura e Aplicada, Brazil  
Postdoctorate of Excellence
- 2012 – 2015 University of Adelaide, Australia  
Australian Research Council DECRA Fellow
- 2010 – 2012 University of Adelaide, Australia  
Research Associate

## Education

- 2006 – 2010 Royal Institute of Technology, Stockholm, Sweden  
Doctor of Philosophy in Mathematical Physics  
Thesis: *Abelian Extensions, Fractional Loop Groups and Quantum Fields*  
Supervised by Jouko Mickelsson
- 2008 – 2009 Massachusetts Institute of Technology, Cambridge, USA  
Visiting Scholar. Supervised by Victor Kac
- 2000 – 2005 Royal Institute of Technology, Stockholm, Sweden  
Master of Science in Engineering Physics
- 2008 – 2009 École Polytechnique, Paris, France  
Stage d'Option Supervisor: Jean-Pierre Bourguignon

## Short-Term Academic Visits

- 2022 Instituto de Ciencias Matemáticas (ICMAT), Visiting Researcher, September–October
- 2022 Mathematical Research Institute at the University of Sydney, Visiting Researcher, April–May
- 2019 Geometry and Physics of Hitchin Systems at the Simons Center, Visiting Researcher, May–June
- 2018 Focus Program at the Fields Institute, Visiting Researcher, June–July
- 2016/2017 University of São Paulo, ICMC, Visiting Researcher, June/March
- 2014 Hausdorff Research Institute for Mathematics, Mathematics Research Fellow, September–October
- 2013 Abdus Salam International Centre for Theoretical Physics, Visiting Researcher, August–September
- 2013 International School for Advanced Studies (SISSA), INdAM Research Fellow, July–August
- 2010 Università di Roma, La Sapienza, Department of Mathematics, Visiting Researcher, January

## Publications

- 2024 Brieskorn Spheres, Cyclic Group Actions and the Milnor Conjecture (with David Baraglia), *Journal of Topology*, **17** 2 (2024), 38 pages
- Equivariant Seiberg-Witten Floer Cohomology (with David Baraglia), *Algebraic and Geometric Topology*, **24** 1 (2024), pp. 493–554
- 2022 A Foliated Hitchin–Kobayashi Correspondence (with David Baraglia), *Advances in Mathematics*, **408** (2022), 42 pages
- 2020 Sign Choices for Orientifolds, (with Michael Murray, Richard Szabo and Raymond Vozzo), *Communications in Mathematical Physics*, **378** 3 (2020), pp. 1843–1873
- 2019 Real Bundle Gerbes, Orientifolds and Twisted  $KR$ -Homology, (with Michael Murray, Richard Szabo and Raymond Vozzo), *Advances in Theoretical and Mathematical Physics*, **23** 8 (2019), pp. 2093–2159
- 2017 Arithmetic of Singular Character Varieties and their  $E$ -polynomials, (with David Baraglia) *Proceedings of the London Mathematical Society*, **114** (2017) pp. 293–33
- 2016 Moduli Spaces of Contact Instantons, (with David Baraglia) *Advances in Mathematics*, **294** (2016) pp. 562–595
- Projective Families of Dirac Operators on a Banach Lie Groupoid, (with Jouko Mickelsson) *Journal of Noncommutative Geometry*, **10** (2016) pp. 1–28
- 2015 A Fourier-Mukai Approach to  $K$ -theory of Compact Lie Groups, (with David Baraglia) *Advances in Mathematics*, **269** (2015) pp. 335–345
- A Geometric Model for Odd Differential  $K$ -theory, (with Michael Murray, Vincent Schlegel and Raymond Vozzo), *Differential Geometry and its Applications*, **40** (2015) pp. 123–158
- Transitive Courant Algebroids, String Structures and T-duality, (with David Baraglia) *Advances in Theoretical and Mathematical Physics*, **19** 3 (2015) pp. 613–672
- 2013 The Faddeev-Mickelsson-Shatashvili Anomaly and Lifting Bundle Gerbes, (with Michael Murray, Danny Stevenson and Raymond Vozzo), *Communications in Mathematical Physics*, **319** 2 (2013), pp. 379–393
- 2012 T-duality of Current Algebras and their Quantization, (with Varghese Mathai) *Contemporary Mathematics*, AMS **584** (2012), pp. 17–38
- The General Caloron Correspondence, (with Michael Murray and Raymond Vozzo) *Journal of Geometry and Physics*, **62** (2012), pp. 224–241
- 2011 Calculus Structure on the Lie Conformal Algebra Complex and the Variational Complex, (with Alberto De Sole and Victor Kac), *Journal of Mathematical Physics*, **52** (2011), 35 pages
- 2010 Fractional Loop Groups and Twisted  $K$ -theory, (with Jouko Mickelsson) *Communications in Mathematical Physics*, **299** 3 (2010), pp. 741–763
- Integrability Criterion for Abelian Extensions of Lie Groups, *Proceedings of the American Mathematical Society*, **138** 11 (2010), pp. 4137–4148

## Preprints

- 2024 New Invariants of Involutions from Seiberg-Witten Floer Theory (with David Baraglia), 53 pages, [arXiv:2403.00203](#)
- 2023 Equivariant Index on Toric Contact Manifolds (with Marcos Orselli), 31 pages, [arXiv:2306.08811](#)

## Research Grants

2024	RDF Near-Miss Faculty Grant, <i>Real Structures and Knot Invariants</i>
2023–2024	RDF Faculty Grant, <i>Periodicity in Knot Theory and Dynamical Systems</i>
2021	Faculty Teaching Development Grant, <i>Minimal Surfaces: A New Initiative for Connecting Calculus to Real-World Applications</i>
2021	Impact Strategic Grant for the outreach project <i>Orbifolds in Music</i>
2018–2021	Marsden Faststart Grant (with D. Baraglia) <i>Exploiting Gauge Theory and Duality in Geometry</i>
2018–2021	Australian Research Council Discovery Project (with M. Murray, R. Vozzo, D. Stevenson, D. Evans), <i>Twisted K-theory, Operator Algebras and Higher Geometry</i>
2017–2018	FRDF Faculty Grant, <i>Symmetries and Quantum Theory: A New Synthesis</i>
2017, 2023	PBRF Faculty Research Grant
2014	ECMS Faculty Research Grant, <i>New Applications of Gauge Theory to Geometry</i>
2013–2015	Australian Research Council Discovery Project, (with M. Murray) <i>Geometric Transforms and Duality</i>
2012–2014	Australian Research Council Discovery Early Career Researcher Award <i>Group Actions and K-theory: A New Direction</i>
2010, 2011	OCLS Faculty Research Grant
2010	Category 1 Faculty Research Grant
2008, 2008	Alice and Knut Wallenberg Foundation Travel Grant
2007	Royal Swedish Academy of Sciences Research Grant

### *Conference Funding and Visiting Fellowships*

2023	Kalman Visiting Fellowship for Francesco Lin (Columbia University)
2022	PBRF funding for the workshop <i>Moduli Spaces and Vertex Algebras</i>
2021	MSI funding for <i>Character Varieties, E-Polynomials and Representation Zeta Functions</i> at the ANU (with D. Baraglia, M. Kamgarpour, U. Onn)
2020	PBRF funding for an <i>Analysis, Geometry and Topology Postgraduate Workshop</i>
2019	Hood Visiting Fellowship for Edward Witten (IAS, Princeton) Faculty funding for the conference <i>Geometry of Quantum Fields and Strings</i> Kalman Visiting Fellowship for Fanny Kassel (IHES, Paris)
2018	PBRF funding for <i>Character Varieties and TQFT</i> (with V. Jones) NZMS funding for graduate students
2017	PBRF funding for <i>Conformal and Symplectic Geometry</i> (with R. Gover) NZMS funding for graduate students
2016	CAPES and FAPERJ funding for <i>String Geometries and Dualities</i> (with H. Bursztyn and R. Heluani)
2010–2017	AMSI and AustMS funding for seven IGA conferences at the University of Adelaide,

## Appointments, Fellowships and Awards

2023	<i>Change One Thing Challenge</i> Teaching Award at the University of Auckland
2022	Visiting Fellowship at the University of Sydney Mathematical Research Institute
2018–2020	Deputy Chair of the Australian and New Zealand Association of Mathematical Physics
2016	Member of the NSF funded research network <i>Geometric Structures and Representation Varieties</i>
2014	Research Fellowship at the Hausdorff Research Institute for Mathematics
2013	ICTP Mathematics Research Fellowship
2013	INdAM Research Fellowship from the Italian Research Council
2011, 2012	Head of School's Award for Lecturing and Tutoring Excellence
2003	Sandviken Award for Outstanding Academic Merit
2003	Anna Whitlock Award for Overseas Studies
2000	Rotary Club Award for Outstanding Academic Merit

## Selected Invited Conference Talks

2023	Representations in Higher Structures, <i>University of Greifswald</i> , June Gauge Theory, Canonical Metrics, and Geometric Structures, <i>ICMAT Madrid</i> , June
2021	Index Theory and Complex Geometry, <i>National University of Singapore</i> , September Perspectives on Algebra, Geometry and Number Theory, <i>Queenstown</i> , April
2020	A Mathematical Medley, <i>University of Auckland</i> , November The 8th Pacific Rim Conference, Representation Theory Session, <i>UC, Berkeley</i> , August The Annual AZNAMP Meeting, <i>University of Queensland</i> , February
2019	The Butcher–Kalman Plenary Lecture, <i>New Zealand Mathematical Society Colloquium</i> , December Spring Operator Algebras Program, <i>East China Normal University, Shanghai</i> , April
2018	Geometric Quantization and Applications, <i>CIRM, Luminy</i> , October Index Theory and Applications to Positive Scalar Curvature and Related Areas, <i>University of Adelaide</i> , June
2017	Third Pacific Rim Mathematical Association Congress, <i>Oaxaca</i> , August Mathematical Congress of the Americas, <i>McGill University</i> , July Loop Spaces, Supersymmetry and Index Theory, <i>Chern Institute</i> , July $K$ -theory, Subfactors and Conformal Field Theory, <i>Isaac Newton Institute, Cambridge</i> , June $T/U$ -dualities and Generalized Geometry, <i>University of Zagreb</i> , June
2016	II Brazilian Meeting for Young in Pure and Applied Mathematics, <i>Campinas</i> , December The Latin American Congress of Mathematicians, <i>Barranquilla</i> , July Gromov-Witten theory, Gauge Theory and Dualities, <i>Australian National University</i> , January
2015	First Brazil-Spain Joint Meeting in Mathematics, <i>Fortaleza</i> , December Interactions between Geometry and Physics, <i>São Paulo</i> , August Infinite-Dimensional Structures in Higher Geometry and Representation Theory, <i>University of Hamburg</i> , Feb.

- 2014 Positive Curvature and Index Theory, *National University of Singapore*, November  
 Quantum Physics and Noncommutative Geometry, *Hausdorff Research Institute for Mathematics*, September  
 Poisson 2014, *University of Illinois at Urbana-Champaign*, August  
 String Geometry and Loop Spaces, *University of Greifswald*, July
- 2013 Representation Theory in Geometry, Topology and Combinatorics, *University of Melbourne*, November  
 Geometry of Strings and Fields, *The Galileo Galilei Institute for Theoretical Physics*, August  
 Moduli Spaces and Mathematical Physics, *CIMAT, Guanajuato*, January

A complete list is available at <http://pedram.hekmati.se>

## Student Supervision

### *PhD Students*

- 2022– Stuart Teisseire (co-supervisor, joint with R. Gover)  
 2021–2024 Xavier Coulter (main supervisor, joint with N. Do)  
*Topological Recursion, Deformations and Interlacing*
- 2017–2024 Bartek Ewertowski, (co-supervisor, joint with R. Gover)  
*Relative BGG Cohomology, Cartan Holonomy Reductions, and Group Cohomology*
- 2019–2023 Marcos Orselli (main supervisor, joint with D. Baraglia)  
*Equivariant Index on Toric Contact Manifolds*
- 2019–2022 Mostafa Raziabrahimsaraei (main supervisor, joint with T. ter Elst)  
*Deformations of the Verlinde Algebra*
- 2018–2022 Olivia Sorto, (main supervisor, joint with R. Gover)  
*Twisted Milnor Torsion for Finite Group Actions*
- 2016–2022 Daniel Snell, (co-supervisor, joint with R. Gover)  
*Distinguished Curves and Submanifolds in Conformal Geometry*
- 2016–2019 Keegan Flood, (co-supervisor, joint with R. Gover)  
*The Geometry of Solutions to the Metrisability Equation in Projective and C-Projective Geometry*

### *Masters Students*

- 2023–2024 Lavender Marshall  
*Concordance Invariants from Grid Homology*
- 2021–2022 Chris Pirie  
*Real Symplectic Implosion*
- 2021–2022 Oliver Li  
*Moduli of Vector Bundles over Algebraic Curves*
- 2019–2020 Elizabeth Jagersma  
*Analytic Torsion and the Cheeger-Müller Theorem*
- 2012–2013 Vincent Schlegel (co-supervised with M. Murray),  
*The Caloron Correspondence and Odd Differential K-theory*

### ***Honours Students***

- 2025 Marc Lescano, *A Primer on Topological Quantum Computation*  
Eugene Di Guiseppe, *The Yamabe Invariant of the Real Projective Plane*
- 2024 Baylee Verzyde, *The Vortex Equations on Non-Orientable Surfaces*
- 2023 Levi Li, *Differential Geometry of Surfaces and the Willmore Conjecture*
- 2022 Joshua Lehman, *A Poincaré-Hopf Theorem for Orbiline Fields*  
Ben Allen, *Aspects of Monstrous Moonshine*
- 2021 Chris Pirie, *Donaldson's Diagonalisability Theorem for Four-Manifolds*
- 2020 Oliver Li (co-supervised with J. Schillewaert), *Sheaves in Algebraic Geometry*  
Xavier Coulter, *Hurwitz Numbers and the Infinite-Wedge Algebra*
- 2019 Hunter Linton, *Localisation in Equivariant Cohomology*  
David Farrell, *Stone Duality and its Generalisations*
- 2018 Louis Christie, *An Analytic Proof of the Morse Inequalities*
- 2013 Thi Quynh Trang Nguyen (co-supervised with D. Baraglia), *Einstein Metrics on Principal Circle Bundles*
- 2011 Adrián F. Tojo (co-supervised with M. Varghese), *Birkhoff Factorisation Applied to Holomorphic Bundles*

### ***Research Students***

- 2024 Chloe Wang, *Applying AI to Find Faster Matrix Multiplication Algorithms*, Summer Research Student  
Yan Liu, *Higher-Dimensional Regression*, Summer Research Student  
Tony Schaufelberger, *Neural Network Application on the Minimum Hybridization Problem*, Research Student
- 2023 Oscar Obioha, *Properties of the Minkowski Space-Time*, Research Student
- 2022 Joshua Lehman, *Chen-Ruan Cohomology of Orbifolds*, Summer Research Student  
Louis Baragwanath, *Mathematics of Machine Learning*, Science Scholar Student  
Benjamin Matson, *Problems in Number Theory*, Science Scholar Student
- 2021 Matthew French, *Clifford and Geometric Algebras*, Summer Research Student  
Pankaj Ghodla, *Differential Geometry of Curves and Surfaces*, Summer Research Student
- 2020 Luis Carlos Soldevilla, *Proof of the Poincare-Hopf Index Theorem*, Research Student  
Juan Kim, *The Riemann Mapping Theorem*, Summer Research Student  
Anish Sachdeva, *Geometry of Möbius Transformations*, Summer Research Student  
Yourong Frank Wang, *Geometry of Chiral Anomalies in Quantum Field Theory*, Summer Research Student  
Dannin Eccles, *Algebraic K-theory and Quadratic Reciprocity*, Summer Research Student
- 2019 Odette Jennings, *q-Polynomials of Rooted Trees*, Science Scholar Student  
Chris Pirie, *Topics in Differential Topology*, Research Student  
Ruta Sliazkaite, *K-theory and Adams Operations*, Northern Hemisphere Summer Research Student
- 2018 Xavier Coulter, *Classification of Root Systems*, Summer Research Student  
Aria Hart, *Geometry of Minimal Surfaces*, Summer Research Student  
Chris Pirie, *Milnor's Exotic 7-Spheres*, Summer Research Student

- Odette Jennings, *Introduction to Knot Invariants*, Summer Research Student  
 Dannin Eccles, *Computations in Khovanov Homology*, Summer Research Student  
 2013 Parsa Kavkani, *Integer Partitions and Young Diagrams*, Summer Research Student  
 2012 Thi Quynh Trang Nguyen, *Geometric Aspects of Yang-Mills Theory*, Adelaide Vacation Research Scholar

## Teaching

### *University of Auckland*

- 2025 General Mathematics II, Summer Semester, Lecturer  
 2024 General Mathematics II, Summer Semester, Lecturer  
 Mathematics for Computer Science, Semester 2, Lecturer and Tutor  
 Fundamental Concepts of Mathematics, Semester 2, Lecturer  
 2023 General Mathematics II, Summer Semester, Lecturer  
 Lie Algebras and Lie Groups, Semester 2, Lecturer and Tutor  
 2022 Calculus, Semester 1, Lecturer and Tutor  
 2021 General Mathematics I, Summer Semester, Lecturer  
 Lie Algebras and Lie Groups, Semester 2, Lecturer and Tutor  
 Real Analysis, Semester 2, Lecturer and Tutor  
 2020 Calculus, Semester 1, Lecturer and Tutor  
 Calculus, Semester 2, Lecturer and Tutor  
 2019 General Mathematics I, Summer Semester, Lecturer  
 Calculus, Semester 2, Lecturer and Tutor  
 Advancing Mathematics 2: Calculus, Semester 2, Lecturer and Tutor  
 2018 Analysis on Manifolds and Differential Geometry, Semester 2, Lecturer  
 Advancing Mathematics 3: Calculus, Semester 2, Lecturer and Tutor  
 Functional Analysis, Semester 2, Lecturer  
 Advancing Mathematics 2: Calculus, Semester 2, Lecturer and Tutor  
 2017 Advancing Mathematics 2: Calculus, Semester 2, Lecturer and Tutor  
 Advancing Mathematics 3: Calculus, Semester 2, Lecturer and Tutor

### *Instituto Nacional de Matemática Pura e Aplicada*

- 2016 Index Theory, Advanced Graduate Course, Lecturer

### *University of Queensland*

- 2015  $K$ -theory and its Applications, Mini-Course at the AMSI Winter School in Brisbane, Lecturer

### *University of Adelaide*

- 2015 Mathematics for Information Technology I: Probability Theory, Semester 1, Lecturer and Tutor  
 2014 Mathematics for Information Technology I: Discrete Mathematics, Semester 1, Lecturer and Tutor  
 Algebraic Topology, Semester 1, Lecturer and Tutor  
 2013 Mathematics IA: Calculus, Semester 1, Lecturer and Tutor

- 2012 Integration and Analysis III, Semester 2, Lecturer and Tutor  
Mathematics IB: Calculus, Semester 1, Lecturer and Tutor
- 2011 Topics in Analysis IV, Semester 2, Lecturer and Tutor  
Introduction to Financial Mathematics I, Semester 1, Lecturer and Tutor

*Royal Institute of Technology*

- 2009 Advanced Quantum Mechanics, Undergraduate Course, Semester 2, Tutor
- 2009 Vector Calculus, Undergraduate Course, Semester 2, Tutor
- 2009 Thermodynamics, Undergraduate Course, Semester 2, Tutor
- 2008 Relativity Theory, Undergraduate Course, Semester 2, Lecturer and Tutor
- 2007 Relativity Theory, Undergraduate Course, Semester 2, Tutor

## Academic Service

- Head of the Analysis, Geometry and Topology Unit, 2023–
- The Departmental NZMS Correspondent, 2023–
- The Departmental PhD Coordinator 2019–2022
- Organiser of the Student Prizes in Mathematics, 2017–2022
- Jury for the Departmental Student Research Conference in Auckland, 2021
- Examiner for 5 PhD theses (U. Adelaide, U. Melbourne, U. Queensland, ANU, NUS Singapore) and 7 Masters theses (U. Auckland, U. Queensland, ANU, U. São Paulo)
- Member of the Hiring Committee for a Lecturer Position in Applied Mathematics, 2020
- Member of the Departmental Research Committee, 2018–2022
- Member of the DATUM 2 Group on Development and Analysis of Teaching in Mathematics, 2019–2021
- Member of the Stage I Course Restructuring Committee, 2018–2019
- Managing Guest-Editor of the Special Issue *String Geometries, Dualities and Topological Matter*, for Elsevier’s Journal of Geometry and Physics, 2017–2018
- On the Advisory Committee for the biannual international conference *Poisson 2022, 2024*
- Reviewer for the AMS Mathematical Reviews and Zentralblatt MATH
- Assessor for the Australian Research Council’s Discovery Project Scheme, the Dutch Research Council’s Innovational Research Incentives Scheme, the Spanish Agencia Estatal de Investigación, and FRDF Faculty Grants
- Referee for *Duke Mathematical Journal*, *Advances in Mathematics*, *Documenta Mathematica*, *International Mathematics Research Notices*, *Journal of Symplectic Geometry*, *Proceedings of the American Mathematical Society*, *Mathematische Nachrichten*, *Journal of Topology and Analysis*, *International Journal of Mathematics*, *Journal of Geometry and Physics*, *Journal of the Australian Mathematical Society*, *AMS Contemporary Mathematics*, *Vietnam Journal of Mathematics*, *New Zealand Journal of Mathematics*, *Journal of Mathematical Physics*, *Differential Geometry and its Applications*, *New York Journal of Mathematics*.



## Conference and Workshop Organisation

- 2024 Co-organiser of the special session *Mathematical Physics* at the Joint Meeting of the AMS, AustMS and NZMS  
Co-organiser of the special session *Index Theory* at the Joint Meeting of the AMS, AustMS and NZMS
- 2023 Co-organiser of the special session *Topology* at the 67th Annual AustMS at the University of Queensland  
Organiser of a workshop on *Analysis on Singular Spaces* in Auckland  
Organiser of a lecture series by the Kalman Fellow *Prof Francesco Lin* in Auckland  
On the local organising committee for *String Math 2023* at the University of Melbourne  
Co-organiser of the conference *Moduli Spaces and Vertex Algebras* in Auckland
- 2022 Co-organiser of the MSI Workshop *Character Varieties, E-Polynomials and Zeta Functions* at ANU, Canberra
- 2021 Organiser of the workshop on *Poisson Geometry, Groupoids and Quantisation* in Auckland
- 2020 Co-organiser of the special session *Recent Trends in Geometric Analysis* at the 8<sup>th</sup> Pacific-RIM Conference on Mathematics at the University of California, Berkeley  
Organiser of an AGT Postgraduate Workshop in Auckland  
Organiser of a public lecture by the Hood Fellow *Prof Edward Witten* in Auckland  
Organiser of the conference *Geometry of Quantum Fields and Strings* in Auckland
- 2019 Co-organiser of the conference *Moduli Spaces, Representation Theory and Quantization* at RIMS, Kyoto  
Co-organiser of a lecture series by *Dr Ramis Movassagh* in Auckland
- 2018 Co-organiser of the conference *Character Varieties and Topological Quantum Field Theory* in Auckland  
Co-organiser of the conference *Conformal and Symplectic Geometry* in Auckland  
Co-organiser of the annual ANZAMP conference in Auckland
- 2017 Co-organiser of a lecture series by *Prof Frances Kirwan* in Adelaide  
Co-organiser of a lecture series by *Prof J r gen Ellegaard Andersen* in Adelaide  
Co-organiser of the AMSI/IGA conference *Gauge Theory and Higher Geometry* in Adelaide  
Organiser of a lecture series by *Dr David Baraglia* in Auckland
- 2016 Co-organiser of the conference *String Geometries and Dualities* at IMPA, Rio de Janeiro
- 2015 Co-organiser of the AMSI/IGA conference *Symmetries and Spinors: Interactions between Geometry and Physics* in Adelaide, featuring lectures by Prof Jos   Figueroa-O'Farrill and Prof Maxim Zabzine
- 2014 Organiser of an IGA lecture series by *Dr Timothy Nguyen* in Adelaide
- 2013 Co-organiser of the IGA conference *Aspects of Finsler Geometry* in Adelaide, featuring lectures by Prof Robert Bryant
- 2013 Co-organiser of a *Special Session in Mathematical Physics* at the 57th Annual AustMS in Sydney  
Co-organiser of the IGA conference *Current Groups and Twisted K-theory* in Adelaide, featuring a lecture series by Prof Jouko Mickelsson
- 2012 Co-organiser of the AMSI/IGA conference *Geometry of Supermanifolds* in Adelaide, featuring a lecture series by Prof Ugo Bruzzo  
Organiser of an IGA lecture series by Dr Ittay Weiss in Adelaide  
Co-organiser of the AMSI/IGA conference *Dualities in Field Theories and the Role of K-Theory* in Adelaide, featuring a lecture series by Prof Jonathan Rosenberg  
Co-organiser of the AMSI/IGA conference *The Mathematical Implications of Gauge-String Dualities* in Adelaide, featuring a lecture series by Prof Rajesh Gopakumar

- 2011 Co-organiser of the AMSI/IGA conference *Group-Valued Moment Maps with Applications to Mathematics and Physics* in Adelaide, featuring a lecture series by Prof Eckhard Meinrenken
- 2010 Co-organiser of the AMSI/IGA conference *The Dirac Operators in Geometry, Topology, Representation Theory, and Physics* in Adelaide, featuring a lecture series by Prof Dan Freed

### ***Seminar Organisation***

- 2023 *Seminar on Floer Homology* at the University of Auckland  
*Seminar on Low-Dimensional Topology* at the University of Auckland
- 2022 *Seminar on Moduli Spaces* at the University of Auckland
- 2021 *Geometry Learning Seminar* at the University of Auckland  
*Seminar on Index Theory* at the University of Auckland
- 2020 *Differential Topology Learning Seminar* at the University of Auckland
- 2019 *Geometry and Topology Learning Seminar* at the University of Auckland  
*General Relativity Bootcamp* at the University of Auckland
- 2018 *Seminar on Homological Algebra* at the University of Auckland
- 2018–2020 *Geometry and Analysis Seminar* at the University of Auckland
- 2017–2019 *Department Colloquium* at the University of Auckland
- 2010–2013 *Strings Journal Club* at the University of Adelaide
- 2009 *Seminar in Mathematical Physics* at MIT

### ***Outreach***

- 2024 *The Shapes of Music*, the INSPIRE Festival in Nelson, New Zealand  
*Geometry of Rhythms*, the OMV STEAM Lab at the WOMAD New Zealand Festival
- 2023 *The Mathematics of Dances*, Discovery Centre for Fundamental Research, University of Auckland  
*Knots in Nature*, Discovery Centre for Fundamental Research, University of Auckland  
*Ahuahanga Day*, University of Auckland  
*Geometry of Musical Rhythms*, University of Auckland
- 2022 *The Monster*, Mathematics Club Seminar, University of Auckland
- 2017 *Crossing Borders Within Mathematics*, Undergraduate Maths Community Seminar, University of Auckland
- 2012 *Examples of Counterexamples*, Undergraduate Seminar, University of Adelaide  
*Unbroken Symmetries*, South Australian Postgraduate Symposium Seminar, Flinders University

### **Professional Memberships**

American Mathematical Society  
 New Zealand Mathematical Society  
 Australian Mathematical Society  
 International Association of Mathematical Physics  
 Australian and New Zealand Association of Mathematical Physics

### **Personal Details**

*Citizenships:* Australia, Sweden  
*Languages:* Swedish, Farsi, English, French, Spanish