

# Curriculum Vitae

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## A/Prof James Parkinson

School of Mathematics and Statistics  
Carslaw building, F07  
University of Sydney, NSW, 2006  
Australia

jamesp@maths.usyd.edu.au  
<http://www.maths.usyd.edu.au/u/jamesp/>

## Employment history

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- **Associate Professor:** University of Sydney, Australia 2020–present
- **Senior Lecturer:** University of Sydney, Australia 2014–2019
- **Lecturer:** University of Sydney, Australia 2009–2013
- **Postdoctoral Fellow:** Technische Universität Graz, Austria 2008
- **Visiting Assistant Professor:** Cornell University, New York, U.S.A. 2007
- **Postdoctoral Fellow:** University of Wisconsin, Madison, U.S.A. 2006

## Education

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- **Ph.D. Pure Mathematics** (University of Sydney, Australia) 2002–2005  
Title: Buildings and Hecke Algebras  
Supervisor: Dr. Donald Cartwright  
Award: T.G. Room medal (outstanding thesis in pure mathematics)  
Scholarship: Australian Postgraduate Award
- **B.Sc.(Adv) Pure Mathematics** (University of Sydney, Australia) 1998–2001  
Thesis title: Regularised Products and Zeta Functions  
Supervisor: Dr. Adrian Nelson  
Grade: Honours class I

## Teaching qualifications

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- **Graduate Certificate in Higher Education** 2010  
University of Sydney, graduated with Merit
- **Principals & Practice of University Teaching** 2009  
University of Sydney
- **Development Program for Research Supervision** 2009  
University of Sydney

## Short term visiting positions

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- **CRM-Simons Scholar:** Centre de Recherches Mathématiques, Montréal Canada June 2024
- **Visiting Professor:** Universite Francois Rebelais de Tours, France Nov 2017
- **Research in Pairs:** CIRM, Aix-Marseille University, France Oct 2017
- **Visiting Professor:** Technische Universität Graz, Austria July–Aug 2017
- **Research in Pairs:** CIRM, Aix-Marseille University, France June 2014
- **Visiting Professor:** Technische Universität Graz, Austria Sept–Oct 2013
- **Visiting Professor:** University of Gent, Belgium July–Aug 2013
- **Visiting Professor:** Technische Universität Graz, Austria Oct 2010
- **Visiting Scholar:** Département de Mathématiques d’Orsay, France Oct 2008
- **Visiting Scholar:** University of Sydney Jan–June 2006, June–Oct 2007, Mar 2008

## Research grants and funding

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- **New Directions in Hecke Algebras** (ARC discovery DP200100712) \$453,000 2021–2023  
James Parkinson (Chief Investigator)  
Jérémie Guilhot (Partner Investigator)  
Bernhard Mühlherr (Partner Investigator)
- **The Geometry of Loop Groups** (ARC discovery DP110103205) \$143,200 2011–2015  
James Parkinson (Chief Investigator)  
Joel Kamnitzer (Partner Investigator)
- **MATRIX conference funding** \$17,000 2020  
(with A. Devillers, J. Schillerwaert, A. Thomas)
- **Near-Miss grant** \$50,000 2016–2017  
University of Western Australia  
(with Alice Devillers, Hendrik Van Maldeghem, Bernhard Mühlherr)
- **Seed Funding** \$11,000 2016–2017  
University of Sydney
- **Start-up Grant** \$12,000 2009–2010  
University of Sydney

## Editorial roles

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- **Editor in Chief** 2021–present  
Innovations in Incidence Geometry.
- **Editor** 2017–2020  
Innovations in Incidence Geometry.
- **Editor** 2017–present  
Bulletin of the Australian Mathematical Society.

## Conference organisation

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- **Conference organiser** 2020  
Groups and Geometries,  
MATRIX, Australia (co-organisers: A. Devillers, J. Schillerwaert, A. Thomas).
- **Special session organiser** 2017  
AustMS annual conference, Algebra
- **Conference organiser** 2017  
Workshop on Buildings and Symmetry  
University of Western Australia, Perth  
Co-organisers: A. Devillers, B. Mühlherr, H. Van Maldeghem.
- **Special session organiser** 2013  
PRIMA2013 conference, Shanghai,  
Representation Theory and Categorification
- **Member of Scientific Committee** 2011  
AustMS annual conference
- **Special session organiser** 2011  
AustMS annual conference, Algebra and Number Theory

## Publications and preprints

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Authorship is listed in alphabetical order.

- **Uniclass automorphisms of spherical buildings**  
(Y. Neyt, J. Parkinson, H. Van Maldeghem)  
Submitted, (2024)
- **Automorphisms and opposition in spherical buildings of exceptional type, IV: The  $E_7$  case**  
(Y. Neyt, J. Parkinson, H. Van Maldeghem, M. Victoor)  
Submitted, 68 pages, (2024)
- **Automorphisms and opposition in spherical buildings of classical type**  
(J. Parkinson, H. Van Maldeghem)  
To appear in *Advances in Geometry*, 41 pages, (2024)
- **On  $J$ -folded alcove paths and combinatorial representations of affine Hecke algebras**  
(J. Guilhot, E. Little, J. Parkinson)  
Submitted, 50 pages (2023)
- **Automorphisms and opposition in spherical buildings of exceptional type, II: Moufang Hexagons**  
(J. Parkinson, H. Van Maldeghem)  
*Innovations in Incidence Geometry*, **20**, 443–470, (2023)
- **Cone types, automata, and regular partitions in Coxeter groups**  
(J. Parkinson, Y. Yau)  
*Advances in Mathematics*, **398**, 1–66, (2022)
- **Automorphisms and opposition in spherical buildings of exceptional type, I**  
(J. Parkinson, H. Van Maldeghem)  
*Canadian Journal of Mathematics*, **74**, 1517–1578 (2022)
- **Patterns in sets of positive density in trees and affine buildings**  
(M. Björklund, A. Fish, J. Parkinson)  
*Groups, Geometry and Dynamics*, **15**, 1267–1295 (2021)
- **Coxeter systems for which the Brink-Howlett automaton is minimal**  
(J. Parkinson, Y. Yau)  
*Journal of Algebra*, **527**, 437–446 (2019)
- **Opposition diagrams for automorphisms of small spherical buildings**  
(J. Parkinson, H. Van Maldeghem)  
*Innovations in Incidence Geometry*, **17**, 141–188 (2019)
- **Balanced representations, the asymptotic Plancherel formula, and Lusztig’s conjectures for  $\tilde{C}_2$**   
(J. Guilhot, J. Parkinson)  
*Algebraic Combinatorics*, **2**, 969–1031 (2019)
- **Opposition diagrams for automorphisms of large spherical buildings**  
(J. Parkinson, H. Van Maldeghem)  
*Journal of Combinatorial Theory, Series A*, **162**, 118–166 (2019)
- **A proof of Lustig’s conjectures for affine type  $G_2$  with arbitrary parameters**  
(J. Guilhot, J. Parkinson)  
*Proceedings of the London Mathematical Society*, **118**, 1188–1244 (2019)
- **Scale and tidy subgroups for Weyl-transitive automorphism groups of buildings**  
(U. Baumgartner, J. Parkinson, J. Ramagge)  
*Journal of Algebra*, **520**, 460–478 (2019)
- **Limit Theorems for random walks on Fuchsian buildings and Kac-Moody groups**  
(L. Gilch, S. Müller, J. Parkinson)  
*Groups, Geometry and Dynamics*, **12**, 1069–1121 (2018)

- **Buildings, groups of Lie type, and random walks**  
(J. Parkinson)  
Groups, Graphs and Random Walks, London Math. Soc. Lec. Notes, **436**, 391–443, (2017)
- **Distance regularity in buildings and structure constants in Hecke algebras**  
(P. Abramenko, J. Parkinson, H. Van Maldeghem)  
Journal of Algebra, **481**, 158–187 (2017)
- **Asymptotic entropy of random walks on Fuchsian buildings and Kac-Moody groups**  
(L. Gilch, S. Müller, J. Parkinson)  
Mathematische Zeitschrift, **285**, 707–738 (2017)
- **Regular sequences and random walks in affine buildings**  
(J. Parkinson, W. Woess)  
Annales de l’Institut Fourier, **65**, 675–707 (2015)
- **The combinatorics of automorphisms and opposition in generalised polygons**  
(J. Parkinson, B. Temmermans, H. Van Maldeghem)  
Annals of Combinatorics **19**, 567–619 (2015)
- **On calibrated representations and the Plancherel Theorem for affine Hecke algebras**  
(J. Parkinson)  
Journal of Algebraic Combinatorics, **40**, 331–371, (2014)
- **Automorphisms and opposition in twin buildings**  
(A. Devillers, J. Parkinson, H. Van Maldeghem)  
Journal of the Australian Mathematical Society, **94**, 189–201 (2013)
- **A classification of commutative parabolic Hecke algebras**  
(P. Abramenko, J. Parkinson, H. Van Maldeghem)  
Journal of Algebra, **385**, 115–133 (2013)
- **A local limit theorem for random walks on the chambers of  $\tilde{A}_2$  buildings**  
(J. Parkinson, B. Schapira)  
Progress in Probability, **64**, Birkhäuser, 15–53 (2011)
- **Combinatorics in affine flag varieties**  
(J. Parkinson, A. Ram, C. Schwer)  
Journal of Algebra, **321**, 3469–3493, (2009)
- **Isotropic random walks on affine buildings**  
(J. Parkinson)  
Annales de l’institut Fourier, **57**, 379–419 (2007)
- **Spherical harmonic analysis on affine buildings**  
(J. Parkinson)  
Mathematische Zeitschrift, **253**, 571–606 (2006)
- **Buildings and Hecke algebras**  
(J. Parkinson)  
Journal of Algebra, **297**, 1–49 (2006)

## Editor

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- **Innovations in Incidence Geometry: Algebraic, Topological and Combinatorial**, **20**, No 2–3, 2023  
Special issue in honour of Jacques Tits  
Editors: A. Betten, D. Leemans, B. Mühlherr, J. Parkinson, K. Thas, H. Van Maldeghem.

## Conference, seminar, and colloquium talks

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- **Opposition diagrams** Sep. 2022  
Polygons, Buildings, and related Geometries, Gent, Belgium (invited main speaker)
- **Cone types, automata, and regular partitions in Coxeter groups** Jul. 2022  
Algebraic Combinatorics of the Symmetric Groups and Coxeter Groups II, Cetraro, Italy
- **Cone types, automata, and regular partitions in Coxeter groups** May 2022  
Algebra Seminar, University of Sydney, Australia
- **Automorphisms and opposition in spherical buildings** Mar. 2022  
Symmetry in Newcastle seminar, University of Newcastle, Australia
- **Automata for Coxeter groups** Aug. 2021  
Symmetry in Newcastle seminar, University of Newcastle, Australia
- **Patterns in sets of positive density in trees and affine buildings** Dec. 2020  
Mathematics C Seminar, University of Graz, Austria
- **Patterns in sets of positive density in trees and affine buildings** Oct. 2019  
Buildings workshop, Magdeburg, Germany
- **Path models in Kazhdan-Lusztig theory** Aug. 2019  
Flags, Galleries and Reflection Groups (invited speaker), University of Sydney, Australia
- **Hecke algebras with unequal parameters II: Plancherel Theorems** Mar. 2019  
IFS Seminar, University of Sydney, Australia
- **Hecke algebras with unequal parameters I: Cells and the a-function** Mar. 2019  
IFS Seminar, University of Sydney, Australia
- **Automorphisms and opposition in spherical buildings** May 2018  
Geometry, Topology and Analysis seminar, University of Sydney, Australia
- **On Lusztig’s conjectures P1–P15** May 2018  
Algebra seminar, University of Sydney, Australia
- **Affine Hecke algebras, buildings, and random walks** Jan. 2018  
Invited minicourse (3 hours), Auckland, New Zealand
- **Random walks on buildings** Nov. 2017  
Colloquium, Laboratoire de Mathématiques et Physique Théorique, Tours, France
- **Large deviation principles and the Martin compactification** Aug. 2017  
Mathematics C Seminar, University of Graz, Austria
- **A multiplicative ergodic theorem for  $p$ -adic Lie groups** July 2016  
Ergodic Theory and its Applications, Conference, Sydney
- **Affine Hecke algebras, buildings, and probability theory** June 2016  
Invited minicourse (5 hours), Tours, France
- **A multiplicative ergodic theorem for  $p$ -adic Lie groups and buildings** June 2016  
MADACA: Random Walks and Dunkl Processes (invited speaker), Sologne, France
- **On automorphisms and opposition in spherical buildings** Nov. 2015  
Seminar, University of Western Australia
- **Domesticity in spherical buildings** Sept. 2015  
Buildings workshop, Münster, Germany
- **A multiplicative ergodic theorem for  $p$ -adic Lie groups** Nov. 2014  
Seminar, Gent University, Belgium
- **A multiplicative ergodic theorem for  $p$ -adic Lie groups** Sept. 2014  
University of Sydney Geometry, Topology and Analysis Seminar, Australia.
- **Random walks on buildings** June 2014  
Groups, Graphs, and Random Walks (invited speaker), Cortona, Italy

- **Automorphisms of generalised polygons** Mar. 2014  
University of Sydney Algebra Seminar, Australia.
- **Generalised polygons** Nov. 2013  
University of Wollongong Colloquium, Australia.
- **Automorphisms and opposition in generalised polygons** Oct. 2013  
Buildings workshop, Münster, Germany
- **Generalised polygons: An introduction** Oct. 2013  
Doctoral program, Technische Universität Graz, Austria.
- **Automorphisms of generalised polygons** Sept. 2013  
Algebra seminar, University of Glasgow, Scotland.
- **A Multiplicative Ergodic Theorem for  $p$ -adic Lie groups** Jul. 2012  
Analysis seminar, University of Ottawa, Canada.
- **Harmonic analysis for Coxeter groups and Hecke algebras** May 2012  
Operator algebras seminar, University of Wollongong, Australia
- **Plancherel Theorems for Hecke algebras and Coxeter groups** Feb. 2012  
AMSI workshop on Symmetry, Wollongong, Australia
- **On automorphisms and opposition in twin buildings** Feb. 2012  
Incidence geometry and buildings, University of Ghent, Belgium
- **On Plancherel Theorems** Feb. 2012  
Group theory seminar, University of Milano (Bicocca), Italy
- **Regular sequences in affine buildings** Feb. 2012  
Mathematics C Seminar, University of Graz, Austria
- **Plancherel Theorems for Hecke algebras and Coxeter groups** Nov. 2011  
Computational approaches to Coxeter groups and Kac-Moody algebras, USyd, Australia
- **A classification of commutative parabolic Hecke algebras** Sept. 2011  
AustMS annual conference, University of Wollongong, Australia
- **The Gindikin-Karpelevich formula** Aug. 2011  
Infinite groups seminar, University of Sydney, Australia
- **Plancherel Theorems and Gindikin-Karpelevich formulas** July 2011  
Seminar, University of Toronto, Canada
- **Classifying commutative parabolic Hecke algebras** Apr. 2011  
Algebra Seminar, University of Sydney, Australia
- **Commutativity of parabolic Hecke algebras** Feb. 2011  
Seminar, Gent University, Belgium
- **Semi-isotropic random walks on affine buildings** Nov. 2010  
Seminar, Centre de Mathématiques et Informatique, Marseille, France
- **Regular sequences in affine buildings** Oct. 2010  
Workshop on buildings, Universität Münster, Germany
- **Random walks on homogeneous trees** Apr. 2010  
Applied Mathematics Seminar, University of Sydney, Australia
- **Representations of Affine Hecke Algebras** Mar. 2010  
Algebra Seminar, University of Sydney, Australia
- **Random walks on affine buildings** Oct. 2009  
Workshop on buildings, Universität Münster, Germany
- **Random walks on  $p$ -adic groups and affine buildings** Sept. 2009  
AustMS annual conference, University of South Australia

- **Random walks on  $p$ -adic groups and buildings** July 2009  
Workshop on boundaries (invited speaker), Technische Universität Graz, Austria
- **Random walks on buildings and reps of Hecke algebras** June 2009  
Algebra seminar, University of Sydney, Australia
- **Harmonic analysis on  $p$ -adic Lie groups** Oct. 2008  
Colloquium, MAPMO, Orléans, France
- **Combinatorics and harmonic analysis on  $p$ -adic Lie groups** Oct. 2008  
Colloquium, Département de Mathématiques d’Orsay, France
- **Horocyclic products of buildings and Borel subgroups** Sept. 2008  
Buildings 2008 workshop, Münster, Germany
- **Horocyclic products of affine buildings** Aug. 2008  
Groups and infinite graphs, Erwin Schrödinger International Institute, Vienna, Austria
- **Alcove walks and harmonic analysis** Apr. 2008  
Harmonic analysis and group actions in analysis, geometry, and probability, Zakopane, Poland
- **Alcove walks in Lie theory** Mar. 2008  
Colloquium, University of Sydney, Australia
- **Constructing positively folded alcove walks** Mar. 2008  
Seminar, Technische Universität Graz, Austria
- **An introduction to buildings II: Examples** Nov. 2007  
Seminar, Technische Universität Graz, Austria
- **An introduction to buildings I: Basic theory** Nov. 2007  
Seminar, Technische Universität Graz, Austria
- **Path combinatorics and retractions in the affine flag variety** Sept. 2007  
Pure mathematics seminar, University of Wollongong, Australia
- **Path combinatorics in loop groups** Aug. 2007  
Algebra seminar, University of Sydney, Australia
- **Kac-Moody groups and Hecke algebras** Apr. 2007  
Lie theory seminar, Cornell University, USA.
- **Basics of buildings** Apr. 2007  
Buildings and combinatorial representation theory, American Institute Math., Palo Alto, USA.
- **The affine Grassmannian and alcove walks** Mar. 2007  
Topology and geometric group theory seminar, Cornell University, USA.
- **A path model for Chevalley groups** Nov. 2006  
AMS special session, Combinatorial representation theory, Arkansas, Fayetteville, USA.
- **Alcove walks** Nov. 2006  
Representation theory and applications workshop, Oberwolfach, Germany
- **Iwahori cosets and alcove walks** Nov. 2006  
Research seminar, Universität zu Köln, Germany
- **Iwahori cosets and alcove walks** Oct. 2006  
Combinatorics Seminar, University of Wisconsin, Madison, USA.
- **Buildings, Hecke algebras, and spherical functions** Sep. 2006  
Lie Theory Seminar, University of Wisconsin, Madison, USA.
- **Isotropic random walks on trees and buildings** Mar. 2006  
Workshop on Discrete Probability, Erwin Schrödinger Institute, Vienna, Austria
- **Random walks on affine buildings** Mar. 2006  
Seminar, Technische Universität Graz, Austria

- **Buildings and Hecke algebras** Sep. 2005  
Algebra Seminar, University of Sydney, Australia
- **Spherical harmonic analysis on affine buildings** Oct. 2005  
Australian Mathematical Society annual conference, University of Western Australia
- **Random walks on trees and grids** May 2005  
 $\Sigma$ UMS talk, University of Sydney, Australia
- **Averaging operators on buildings** Oct. 2004  
AustMS annual conference, Royal Melbourne Institute of Technology, Australia

## Teaching Experience

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- **Rings fields and Galois Theory** 2015, 2016, 2017, 2018, 2019, 2020  
Third year Advanced, USyd
- **Functional Analysis** 2011, 2012, 2013, 2022, 2023  
Fourth year honours, USyd
- **Representation Theory and Random Walks** 2010  
Postgraduate course, Graz, Austria
- **Groups with  $BN$ -pairs** 2009  
Fourth year honours course, AMSI summer school, Wollongong
- **Graph Theory** 2011  
Reading course, USyd
- **Advanced Integral Calculus** 2009, 2010, 2011, 2012, 2021  
First year undergraduate, USyd
- **Advanced Vector Calculus** 2009, 2010, 2011, 2012, 2014  
Second year undergraduate, USyd
- **Vector Calculus** 2022  
Second year undergraduate, USyd
- **Differential Calculus** 2006, 2009, 2010, 2013, 2021  
First year undergraduate, USyd
- **Advanced Multivariable Calculus and Modelling** 2018, 2019, 2022, 2023  
First year undergraduate, USyd
- **Advanced Differential Calculus** 2014, 2015, 2016  
First year undergraduate, USyd
- **Multivariable calculus** 2007  
Senior undergraduate, Cornell University, U.S.A.
- **Integral calculus** 2006  
First year undergraduate, USyd
- **Linear algebra I** 2005, 2011, 2012, 2014, 2015, 2016  
First year undergraduate, various levels, USyd
- **Linear algebra II** 2004, 2005  
Second year undergraduate, Summer school, USyd
- **Symmetries of Platonic solids** 2014, 2015, 2016  
Undergraduate talented student program, USyd
- **Fermat's Last Theorem modulo  $p$**  2019, 2023  
Undergraduate talented student program, USyd
- **Finite Simple Groups** 2016  
Reading course, USyd



# Students and Postdoctoral Researchers Supervised

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- **Postdoctoral Researchers:**
  - **Nathan Chapelier** 2023
  - **Yeeka Yau** 2021–2022
  - **Tommaso Terragni** 2012
- **Ph.D. Students:**
  - **Eloise Little** (Supervisor: J. Parkinson, Associate Supervisor: O. Yacobi) 2022–  
*Path models and Kazhdan-Lusztig theory*
  - **Yeeka Yau** (Supervisor: J. Parkinson, Associate Supervisor: O. Yacobi) 2017–2021  
*Automatic structures for Coxeter groups*
  - **Kamil Bulinski** (Supervisor: A. Fish, Associate Supervisor: J. Parkinson) 2014–2017  
*Ergodic theory and combinatorial number theory*
- **Masters Students:**
  - **Phil Bos** (Supervisor: J. Parkinson, Associate Supervisor: D. Cartwright) 2013–2017  
*On Ramanujan's  $\tau$ -function, Modular Forms, and Hecke Operators*
- **Honours Students:**
  - **Max Mikkelsen** 2022–2023  
*Kazhdan-Lusztig theory with arbitrary parameters*
  - **Eloise Little** 2020–2021  
*Coxeter groups and Kazhdan-Lusztig cells*
  - **Thomas Arblaster** 2019 (disc)  
*The inverse Galois problem*
  - **Oliver Scarlet** 2019 (disc)  
*Kazhdan-Lusztig cells*
  - **Jacob Loader** 2019  
*Random walks on groups*
  - **Yeeka Yau** 2016  
*Automata for Coxeter groups*
  - **Zhenglyu Huang** 2016  
*Projective geometry*
  - **Christopher Shaw** 2014–2015  
*Automatic groups*
  - **David Manescu** 2014  
*Parameters of generalised polygons*
  - **Jon Xu** 2012  
*Generalised polygons*
  - **Audra McMillan** 2011  
*Hecke algebras: Theory and applications*
  - **Matthias Wong** 2010  
*Harmonic analysis on homogeneous trees*
- **Vacation Scholars:**
  - **Oliver Chambers** 2011  
*Representations and random walks*
  - **Yiming Deng** 2010  
*Random walks on  $\mathbb{Z}^d$  and affine Coxeter groups*
- **Other:**
  - **Christian Habighorst** 2010  
Diploma student (Münster, Germany): *Brownian motion on affine buildings*

## Ph.D. Juries

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- **Johannes Roth**, University of Gent 2021
- **Magali Victoor**, University of Gent 2024

## Service

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- **Honours Lead, Faculty of Science** 2023
- **LPC promotions committee, Business School** (core external member) 2022
- **LPC promotions committee, Business School** (core external member) 2021
- **Advanced Stream Working Group** (USyd) 2021
- **LPC promotions committee, Business School** (core external member) 2020
- **Faculty Assessments, Quality, and Standards Working Group** (USyd) 2019, 2020
- **International Visitor Program** (Selection committee member) 2017, 2018
- **Education committee** (USyd Mathematics) 2021
- **Academic program committee** (USyd Mathematics) 2014, 2015, 2016, 2017
- **Undergraduate studies committee** (USyd) 2014, 2015, 2016, 2017
- **Management Committee** (USyd Mathematics) 2018, 2019
- **Academic board** (USyd) 2018, 2019, 2020, 2021, 2022, 2023
- **Student Support Scheme Committee** 2016–2018  
Australian Mathematical Society
- **Curriculum review committee** (USyd Mathematics) 2016, 2017
- **USyd Correspondent to Australian Mathematical Society Gazette** 2009–2011
- **USyd Second year pure mathematics coordinator** 2010–2013
- **Seminar organiser** 2006  
Lie Theory, University of Wisconsin-Madison, U.S.A.
- **Referee** (various journals) 2007–
- **Lecturer at MANSW talented student day** 2010  
Random walks: an introduction
- **Mathematics coordinator for Science in The City** 2009, 2010, 2011
- **Mathematics coordinator for Sydney Open Day** 2009, 2010, 2011