

## Details

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<b>Dr. James Parkinson</b>	<code>jamesp@maths.usyd.edu.au</code>
School of Mathematics and Statistics	Phone: +61 2 9351 4221
Carslaw building, F07	<a href="http://www.maths.usyd.edu.au/u/jamesp/">http://www.maths.usyd.edu.au/u/jamesp/</a>
University of Sydney, NSW, 2006	Nationality: Australian
Australia	Date of birth: October 16, 1979

## Education

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

## 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

## Employment history

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

## Short term visiting positions

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- **Visiting Professor:** Universite Francois Rebelais de Tours, France November 2017
- **Research in Pairs:** CIRM, Aix-Marseille University, France October 2017
- **Visiting Professor:** Technische Universität Graz, Austria July–August 2017
- **Research in Pairs:** CIRM, Aix-Marseille University, France June 2014
- **Visiting Professor:** Technische Universität Graz, Austria September–October 2013

- **Visiting Professor:** University of Gent, Belgium July–August 2013
- **Visiting Professor:** Technische Universität Graz, Austria October 2010
- **Visiting Scholar:** Département de Mathématiques d’Orsay, France October 2008
- **Visiting Scholar:** University of Sydney March 2008
- **Visiting Scholar:** University of Sydney June–October 2007
- **Visiting Scholar:** University of Sydney January–June 2006

## Publications and preprints

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Authorship is listed in alphabetical order and contributions for all authors may be assumed to be equal

- **Opposition diagrams for automorphisms of small spherical buildings.**  
(J. Parkinson, H. Van Maldeghem)  
Submitted, 36 pages, (2018)
- **Balanced representations, the asymptotic Plancherel formula, and Lusztig’s conjectures for  $\tilde{C}_2$ .**  
(J. Guilhot, J. Parkinson)  
Submitted, 43 pages, (2018)
- **Opposition diagrams for automorphisms of large spherical buildings.**  
(J. Parkinson, H. Van Maldeghem)  
Submitted, 38 pages, (2017)
- **A proof of Lusztig’s conjectures for affine type  $G_2$  with arbitrary parameters.**  
(J. Guilhot, J. Parkinson)  
Submitted, 40 pages, (2017)
- **Scale and tidy subgroups for Weyl-transitive automorphism groups of buildings.**  
(U. Baumgartner, J. Parkinson, J. Ramagge)  
Submitted, 18 pages, (2017)
- **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)
- **Limit Theorems for random walks on Fuchsian buildings and Kac-Moody groups.**  
(L. Gilch, S. Müller, J. Parkinson)  
Groups, Geometry and Dynamics, to appear, 39 pages (2016)
- **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)
- **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)

## Conference, seminar, and colloquium talks

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- **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  
University of Sydney, 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, U.S.A.
- **Basics of buildings** Apr. 2007  
Buildings and combinatorial representation theory workshop  
American Institute of Mathematics, Palo Alto, U.S.A.
- **The affine Grassmannian and alcove walks** Mar. 2007  
Topology and geometric group theory seminar, Cornell University, U.S.A.
- **A path model for Chevalley groups** Nov. 2006  
A.M.S. special session, Combinatorial representation theory  
Arkansas, Fayetteville, U.S.A.
- **Alcove walks** Nov. 2006  
Representation theory and applications workshop  
Mathematisches Forschungsinstitut 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, U.S.A.
- **Buildings, Hecke algebras, and spherical functions** Sep. 2006  
Lie Theory Seminar, University of Wisconsin, Madison, U.S.A.
- **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  
ΣUMS talk, University of Sydney, Australia
- **Averaging operators on buildings** Oct. 2004  
AustMS annual conference  
Royal Melbourne Institute of Technology, Australia

## Grants

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- **Seed Funding** 2016–2017  
University of Sydney, \$11,000

- **Near-Miss Funding**  
University of Western Australia  
Alice Devillers (Chief Investigator)  
James Parkinson (Chief Investigator)  
Hendrik Van Maldeghem (Partner Investigator)  
Bernhard Mühlherr (Partner Investigator)  
University of Sydney, \$50,000
2016–2017
- **The Geometry of Loop Groups** (ARC discovery DP110103205)  
James Parkinson (Chief Investigator)  
Joel Kamnitzer (Partner Investigator)  
\$150,000 approx.
2011–2013
- **Conference Travel Grant**  
University of Sydney, \$2,500
2010
- **Conference Travel Grant**  
University of Sydney, \$2,500
2009
- **Start-up Grant**  
University of Sydney, \$12,000
2009–2010

## Editorial roles

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

## Conference organisation

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

## Teaching Experience

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- **Rings fields and Galois Theory** 2015, 2016, 2017, 2018  
Third year Advanced, USyd
- **Functional Analysis** 2011, 2012, 2013  
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, 2018  
First year undergraduate, USyd
- **Advanced Vector Calculus** 2009, 2010, 2011, 2012, 2014  
Second year undergraduate, USyd
- **Differential Calculus** 2006, 2009, 2010, 2013  
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
- **Finite Simple Groups** 2016  
Reading course, USyd

## Students supervised

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- **Ph.D. Students:**
  - Yee Yau** (Supervisor: J. Parkinson, Associate Supervisor: O. Yacobi) 2017–  
*Automatic structures for Coxeter groups*
  - Ben Szczesny** (Supervisor: A. Henderson, Associate Supervisor: J. Parkinson) 2016–  
*De Concini-Procesi models associated to finite 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:**
- Yee 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*

## Mathematical service

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- **Student Support Scheme Committee** 2016–2018  
 Australian Mathematical Society  
 Incoming chair (2016), chair (2017), outgoing chair (2018).
- **USyd Correspondent to Australian Mathematical Society Gazette** 2009–2011
- **Seminar organiser** 2006  
 Lie Theory, University of Wisconsin-Madison, U.S.A.
- **Referee** (various journals) 2007–
- **Reviewer** (MathSciNet)

## Internal service

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- **International Visitor Program** (Selection committee member) 2017
- **Academic program committee** (USyd Mathematics) 2014, 2015, 2016, 2017
- **Undergraduate studies committee** (USyd) 2014, 2015, 2016, 2017
- **Academic board** (USyd) 2018
- **Curriculum review committee** (USyd Mathematics) 2016, 2017
- **USyd Second year pure mathematics coordinator** 2010–2013

## Outreach

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- **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