

## Details

---

**Dr. James Parkinson**

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

[jamesp@maths.usyd.edu.au](mailto:jamesp@maths.usyd.edu.au)

Phone: +61 2 9351 4221

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

Nationality: Australian

Date of birth: October 16, 1979

## Education

---

1. **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
2. **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

---

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

## Employment history

---

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

## Short term visiting positions

---

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

- |  |                   |
|--|-------------------|
| 6. <b>Visiting Professor:</b> University of Gent, Belgium                | July–August 2013  |
| 7. <b>Visiting Professor:</b> Technische Universität Graz, Austria       | October 2010      |
| 8. <b>Visiting Scholar:</b> Département de Mathématiques d’Orsay, France | October 2008      |
| 9. <b>Visiting Scholar:</b> University of Sydney                         | March 2008        |
| 10. <b>Visiting Scholar:</b> University of Sydney                        | June–October 2007 |
| 11. <b>Visiting Scholar:</b> University of Sydney                        | January–June 2006 |

## Publications and preprints

---

17. **Opposition diagrams for automorphisms of large spherical buildings.**  
(J. Parkinson, H. Van Maldeghem)  
Preprint (2017)
16. **A proof of Lustig’s conjectures for affine type  $G_2$  with arbitrary parameters.**  
(J. Guillhot, J. Parkinson)  
Preprint (2017)
15. **Scale and tidy subgroups for Weyl-transitive automorphism groups of buildings.**  
(U. Baumgartner, J. Parkinson, J. Ramagge)  
Preprint (2017)
14. **Buildings, groups of Lie type, and random walks.**  
(J. Parkinson)  
Groups, Graphs and Random Walks, London Math. Soc. Lec. Notes, **436**, (2017)
13. **Distance regularity in buildings and structure constants in Hecke algebras.**  
(P. Abramenko, J. Parkinson, H. Van Maldeghem)  
Journal of Algebra, **481**, 158–187 (2017)
12. **Asymptotic entropy of random walks on Fuchsian buildings and Kac-Moody groups.**  
(L. Gilch, S. Müller, J. Parkinson)  
Mathematische Zeitschrift, **285**, 707–738 (2017)
11. **Limit Theorems for random walks on Fuchsian buildings and Kac-Moody groups.**  
(L. Gilch, S. Müller, J. Parkinson)  
Groups, Geometry and Dynamics, to appear (2016)
10. **Regular sequences and random walks in affine buildings.**  
(J. Parkinson, W. Woess)  
Annales de l’Institut Fourier, **65**, 675–707 (2015)
9. **The combinatorics of automorphisms and opposition in generalised polygons.**  
(J. Parkinson, B. Temmermans, H. Van Maldeghem)  
Annals of Combinatorics **19**, 567–619 (2015)
8. **Calibrated representations and the Plancherel Theorem for affine Hecke algebras.**  
(J. Parkinson)  
Journal of Algebraic Combinatorics, **40**, 331–371, (2014)
7. **Automorphisms and opposition in twin buildings.**  
(A. Devillers, J. Parkinson, H. Van Maldeghem)  
Journal of the Australian Mathematical Society, **94**, 189–201 (2013)

6. **A classification of commutative parabolic Hecke algebras.**  
(P. Abramenko, J. Parkinson, H. Van Maldeghem)  
Journal of Algebra, **385**, 115–133 (2013)
5. **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)
4. **Combinatorics in affine flag varieties.**  
(J. Parkinson, A. Ram, C. Schwer)  
Journal of Algebra, **321**, 3469–3493, (2009)
3. **Isotropic random walks on affine buildings.**  
(J. Parkinson)  
Annales de l’institut Fourier, **57**, 379–419 (2007)
2. **Spherical harmonic analysis on affine buildings.**  
(J. Parkinson)  
Mathematische Zeitschrift, **253**, 571–606 (2006)
1. **Buildings and Hecke algebras.**  
(J. Parkinson)  
Journal of Algebra, **297**, 1–49 (2006)

## Conference, seminar, and colloquium talks

---

- |   |            |
|---|------------|
| 61. <b>Affine Hecke algebras, buildings, and random walks</b><br>Invited minicourse (3 hours), Auckland, New Zealand  | Jan. 2018  |
| 60. <b>Random walks on buildings</b><br>Colloquium, Laboratoire de Mathématiques et Physique Théorique, Tours, France   | Nov. 2017  |
| 59. <b>Large deviation principles and the Martin compactification</b><br>Mathematics C Seminar, University of Graz, Austria   | Aug. 2017  |
| 58. <b>A multiplicative ergodic theorem for <math>p</math>-adic Lie groups</b><br>Ergodic Theory and its Applications, Conference, Sydney                                   | July 2016  |
| 57. <b>Affine Hecke algebras, buildings, and probability theory</b><br>Invited minicourse (5 hours), Tours, France  | June 2016  |
| 56. <b>A multiplicative ergodic theorem for <math>p</math>-adic Lie groups and buildings</b><br>MADACA: Random Walks and Dunkl Processes (invited speaker), Sologne, France | June 2016  |
| 55. <b>On automorphisms and opposition in spherical buildings</b><br>Seminar, University of Western Australia   | Nov. 2015  |
| 54. <b>Domesticity in spherical buildings</b><br>Buildings workshop, Münster, Germany   | Sept. 2015 |
| 53. <b>A multiplicative ergodic theorem for <math>p</math>-adic Lie groups</b><br>Seminar, Gent University, Belgium   | Nov. 2014  |
| 52. <b>A multiplicative ergodic theorem for <math>p</math>-adic Lie groups</b><br>University of Sydney Geometry, Topology and Analysis Seminar, Australia.                  | Sept. 2014 |
| 51. <b>Random walks on buildings</b><br>Groups, Graphs, and Random Walks (invited speaker), Cortona, Italy  | June 2014  |

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

- 30. **Representations of Affine Hecke Algebras** Mar. 2010  
Algebra Seminar, University of Sydney, Australia
- 29. **Random walks on affine buildings** Oct. 2009  
Workshop on buildings, Universität Münster, Germany
- 28. **Random walks on  $p$ -adic groups and affine buildings** Sept. 2009  
AustMS annual conference, University of South Australia
- 27. **Random walks on  $p$ -adic groups and buildings** July 2009  
Workshop on boundaries (invited speaker)  
Technische Universität Graz, Austria
- 26. **Random walks on buildings and reps of Hecke algebras** June 2009  
Algebra seminar, University of Sydney, Australia
- 25. **Harmonic analysis on  $p$ -adic Lie groups** Oct. 2008  
Colloquium, MAPMO, Orléans, France
- 24. **Combinatorics and harmonic analysis on  $p$ -adic Lie groups** Oct. 2008  
Colloquium, Département de Mathématiques d'Orsay, France
- 23. **Horocyclic products of buildings and Borel subgroups** Sept. 2008  
Buildings 2008 workshop, Münster, Germany
- 22. **Horocyclic products of affine buildings** Aug. 2008  
Groups and infinite graphs, Erwin Schrödinger International Institute  
Vienna, Austria
- 21. **Alcove walks and harmonic analysis** Apr. 2008  
Harmonic analysis and group actions in analysis, geometry, and probability  
Zakopane, Poland
- 20. **Alcove walks in Lie theory** Mar. 2008  
Colloquium, University of Sydney, Australia
- 19. **Constructing positively folded alcove walks** Mar. 2008  
Seminar, Technische Universität Graz, Austria
- 18. **An introduction to buildings II: Examples** Nov. 2007  
Seminar, Technische Universität Graz, Austria
- 17. **An introduction to buildings I: Basic theory** Nov. 2007  
Seminar, Technische Universität Graz, Austria
- 16. **Path combinatorics and retractions in the affine flag variety** Sept. 2007  
Pure mathematics seminar, University of Wollongong, Australia
- 15. **Path combinatorics in loop groups** Aug. 2007  
Algebra seminar, University of Sydney, Australia
- 14. **Kac-Moody groups and Hecke algebras** Apr. 2007  
Lie theory seminar, Cornell University, U.S.A.
- 13. **Basics of buildings** Apr. 2007  
Buildings and combinatorial representation theory workshop  
American Institute of Mathematics, Palo Alto, U.S.A.
- 12. **The affine Grassmannian and alcove walks** Mar. 2007  
Topology and geometric group theory seminar, Cornell University, U.S.A.

- |   |           |
|---|-----------|
| 11. <b>A path model for Chevalley groups</b><br>A.M.S. special session, Combinatorial representation theory<br>Arkansas, Fayetteville, U.S.A.     | Nov. 2006 |
| 10. <b>Alcove walks</b><br>Representation theory and applications workshop<br>Mathematisches Forschungsinstitut Oberwolfach, Germany              | Nov. 2006 |
| 9. <b>Iwahori cosets and alcove walks</b><br>Research seminar, Universität zu Köln, Germany   | Nov. 2006 |
| 8. <b>Iwahori cosets and alcove walks</b><br>Combinatorics Seminar, University of Wisconsin, Madison, U.S.A.                                      | Oct. 2006 |
| 7. <b>Buildings, Hecke algebras, and spherical functions</b><br>Lie Theory Seminar, University of Wisconsin, Madison, U.S.A.                      | Sep. 2006 |
| 6. <b>Isotropic random walks on trees and buildings</b><br>Workshop on Discrete Probability, Erwin Schrödinger Institute<br>Vienna, Austria       | Mar. 2006 |
| 5. <b>Random walks on affine buildings</b><br>Seminar, Technische Universität Graz, Austria   | Mar. 2006 |
| 4. <b>Buildings and Hecke algebras</b><br>Algebra Seminar, University of Sydney, Australia  | Sep. 2005 |
| 3. <b>Spherical harmonic analysis on affine buildings</b><br>Australian Mathematical Society annual conference<br>University of Western Australia | Oct. 2005 |
| 2. <b>Random walks on trees and grids</b><br>ΣUMS talk, University of Sydney, Australia   | May 2005  |
| 1. <b>Averaging operators on buildings</b><br>AustMS annual conference<br>Royal Melbourne Institute of Technology, Australia                      | Oct. 2004 |

## Grants

---

- |  |           |
|--|-----------|
| 1. <b>University of Sydney Seed Funding</b><br>University of Sydney, \$11,000  | 2016–2017 |
| 2. <b>Near-Miss Funding</b><br>University of Western Australia<br>Alice Devillers (Chief Investigator)<br>James Parkinson (Chief Investigator)<br>Hendrik Van Maldeghem (Partner Investigator)<br>Bernhard Mühlherr (Partner Investigator)<br>University of Sydney, \$50,000 | 2016–2017 |
| 3. <b>The Geometry of Loop Groups</b> (ARC discovery DP110103205)<br>James Parkinson (Chief Investigator)<br>Joel Kamnitzer (Partner Investigator)<br>\$150,000 approx.  | 2011–2013 |

- |  |           |
|--|-----------|
| 4. <b>Conference Travel Grant</b><br>University of Sydney, \$2,500 | 2010      |
| 5. <b>Conference Travel Grant</b><br>University of Sydney, \$2,500 | 2009      |
| 6. <b>Start-up Grant</b><br>University of Sydney, \$12,000         | 2009–2010 |

## Editorial roles

---

- |  |       |
|--|-------|
| 1. <b>Editor</b><br>Bulletin of the Australian Mathematical Society. | 2017– |
| 2. <b>Editor</b><br>Innovations in Incidence Geometry.               | 2017– |

## Conference organisation

---

- |   |      |
|---|------|
| 1. <b>Special session organiser</b><br>AustMS annual conference, Algebra  | 2017 |
| 2. <b>Conference organiser</b><br>Workshop on Buildings and Symmetry<br>University of Western Australia, Perth<br>Co-organisers: A. Devillers, B. Mühlherr, H. Van Maldeghem. | 2017 |
| 3. <b>Special session organiser</b><br>PRIMA2013 conference, Shanghai,<br>Representation Theory and Categorification  | 2013 |
| 4. <b>Member of Scientific Committee</b><br>AustMS annual conference  | 2011 |
| 5. <b>Special session organiser</b><br>AustMS annual conference, Algebra and Number Theory  | 2011 |

## Teaching Experience

---

- |   |                        |
|---|------------------------|
| 1. <b>Rings fields and Galois Theory</b><br>Third year Advanced, USyd                                     | 2015, 2016, 2017       |
| 2. <b>Functional Analysis</b><br>Fourth year honours, USyd  | 2011, 2012, 2013       |
| 3. <b>Representation Theory and Random Walks</b><br>Postgraduate course, Graz, Austria                    | 2010                   |
| 4. <b>Groups with <math>BN</math>-pairs</b><br>Fourth year honours course, AMSI summer school, Wollongong | 2009                   |
| 5. <b>Graph Theory</b><br>Reading course, USyd  | 2011                   |
| 6. <b>Advanced Integral Calculus</b><br>First year undergraduate, USyd                                    | 2009, 2010, 2011, 2012 |

- |  |                                    |
|--|------------------------------------|
| 7. <b>Advanced Vector Calculus</b><br>Second year undergraduate, USyd                    | 2009, 2010, 2011, 2012,<br>2014    |
| 8. <b>Differential Calculus</b><br>First year undergraduate, USyd                        | 2006, 2009, 2010, 2013             |
| 9. <b>Advanced Differential Calculus</b><br>First year undergraduate, USyd               | 2014, 2015, 2016                   |
| 10. <b>Multivariable calculus</b><br>Senior undergraduate, Cornell University, U.S.A.    | 2007                               |
| 11. <b>Integral calculus</b><br>First year undergraduate, USyd                           | 2006                               |
| 12. <b>Linear algebra I</b><br>First year undergraduate, various levels, USyd            | 2005, 2011, 2012, 2014, 2015, 2016 |
| 13. <b>Linear algebra II</b><br>Second year undergraduate, Summer school, USyd           | 2004, 2005                         |
| 14. <b>Symmetries of Platonic solids</b><br>Undergraduate talented student program, USyd | 2014, 2015, 2016                   |
| 15. <b>Finite Simple Groups</b><br>Reading course, USyd                                  | 2016                               |

## Students supervised

---

### 1. Ph.D. Students:

- |  |           |
|--|-----------|
| (a) <b>Yee Yau</b> (Supervisor: J. Parkinson, Associate Supervisor: O. Yacobi)<br><i>Automatic structures for Coxeter groups</i>                               | 2017–     |
| (b) <b>Ben Szczesny</b> (Supervisor: A. Henderson, Associate Supervisor: J. Parkinson)<br><i>De Concini-Procesi models associated to finite Coxeter groups</i> | 2016–     |
| (c) <b>Kamil Bulinski</b> (Supervisor: A. Fish, Associate Supervisor: J. Parkinson)<br><i>Ergodic theory and combinatorial number theory</i>                   | 2014–2017 |

### 2. Masters Students:

- |   |           |
|---|-----------|
| (a) <b>Phil Bos</b> (Supervisor: J. Parkinson, Associate Supervisor: D. Cartwright)<br><i>On Ramanujan's <math>\tau</math>-function, Modular Forms, and Hecke Operators</i> | 2013–2017 |
|---|-----------|

### 3. Honours Students:

- |   |           |
|---|-----------|
| (a) <b>Yee Yau</b><br><i>Automata for Coxeter groups</i>                    | 2016      |
| (b) <b>Zhenglyu Huang</b><br><i>Projective geometry</i>                     | 2016      |
| (c) <b>Christopher Shaw</b><br><i>Automatic groups</i>                      | 2014–2015 |
| (d) <b>David Manescu</b><br><i>Parameters of generalised polygons</i>       | 2014      |
| (e) <b>Jon Xu</b><br><i>Generalised polygons</i>                            | 2012      |
| (f) <b>Audra McMillan</b><br><i>Hecke algebras: Theory and applications</i> | 2011      |



- (g) **Matthias Wong** 2010  
*Harmonic analysis on homogeneous trees*
- 4. **Vacation Scholars:**
  - (a) **Oliver Chambers** 2011  
*Representations and random walks*
  - (b) **Yiming Deng** 2010  
*Random walks on  $\mathbb{Z}^d$  and affine Coxeter groups*
- 5. **Other:**
  - (a) **Christian Habighorst** 2010  
Diploma student (Münster, Germany): *Brownian motion on affine buildings*

## Mathematical service

---

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

## Internal service

---

- 1. **International Visitor Program** (Selection committee member) 2017
- 2. **Academic program committee** (USyd Mathematics) 2014, 2015, 2016, 2017
- 3. **Undergraduate studies committee** (USyd) 2014, 2015, 2016, 2017
- 4. **Curriculum review committee** (USyd Mathematics) 2016, 2017
- 5. **USyd Second year pure mathematics coordinator** 2010–2013

## Outreach

---

- 1. **Lecturer at MANSW talented student day** 2010  
Random walks: an introduction
- 2. **Mathematics coordinator for Science in The City** 2009, 2010, 2011
- 3. **Mathematics coordinator for Sydney Open Day** 2009, 2010, 2011