

Curriculum Vitae

A/Prof James Parkinson
School of Mathematics and Statistics
Carslaw building, F07
University of Sydney, NSW, 2006
Australia

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Nationality: Australian
Date of birth: October 16, 1979

Employment history

- **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

- **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

- **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

- **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 Mar 2008
- **Visiting Scholar:** University of Sydney June–Oct 2007
- **Visiting Scholar:** University of Sydney Jan–June 2006

Publications and preprints

Authorship is listed in alphabetical order.

- **Automorphisms and opposition in spherical buildings of exceptional type, I**
(J. Parkinson, H. Van Maldeghem)
Submitted (2020)
- **Patterns in sets of positive density in trees and affine buildings**
(M. Björklund, A. Fish, J. Parkinson)
Submitted (2019)
- **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, to appear, (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 Lusztig’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)
- **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

- **Opposition diagrams** June 2020
Polygons, Buildings, and related Geometries, Gent, Belgium
- **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
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
 Σ UMS talk, University of Sydney, Australia
- **Averaging operators on buildings** Oct. 2004
AustMS annual conference
Royal Melbourne Institute of Technology, Australia

Research grants and funding

- **New Directions in Hecke Algebras** (ARC discovery DP200100712) \$453,000 2020–2022
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

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

Conference organisation

- **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

Teaching Experience

- **Rings fields and Galois Theory** 2015, 2016, 2017, 2018, 2019
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
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
- **Multivariable Calculus and Modelling** 2018, 2019
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
Undergraduate talented student program, USyd
- **Finite Simple Groups** 2016
Reading course, USyd

Students supervised

- **Ph.D. Students:**
 - **Yeeka Yau** (Supervisor: J. Parkinson, Associate Supervisor: O. Yacobi) 2017–2020
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 τ -function, Modular Forms, and Hecke Operators
- **Honours Students:**
 - **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*

Mathematical service

- **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–

Internal service

- **Faculty Assessments, Quality, and Standards Working Group** (USyd) 2019
- **International Visitor Program** (Selection committee member) 2017, 2018
- **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
- **Curriculum review committee** (USyd Mathematics) 2016, 2017
- **USyd Second year pure mathematics coordinator** 2010–2013

Outreach

- **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