

Robert Marsh — Curriculum Vitae. December 2011.

Name: Robert James Marsh

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Main research fields: Cluster algebras, Representation theory of finite dimensional algebras, Algebraic groups, Algebraic combinatorics.

Distinctions

- London Mathematical Society *Whitehead* Prize, July 2009.
- EPSRC Leadership Fellow, "Cluster-tilting theory", 2008-2013.
- Leverhulme Fellowship, "Applications of canonical bases," January to August 2003.
- Member of the EPSRC Peer Review College 1/1/2003 – to date.
- University of Leicester Achievement Bonus awarded in March 2001 and June 2004.

Employment:

- Professor, University of Leeds, June 2009 – to date.
- Reader, University of Leeds, September 2006 – May 2009.
- Reader, University of Leicester, April 2005 – August 2006.
- Lecturer, University of Leicester, September 1998 – March 2005.
- Research Assistant (to Ken Brown), University of Glasgow, October 1996 – August 1998.
- Research Assistant (to Claus Michael Ringel), University of Bielefeld, January – September 1996.

Qualifications:

- PhD Mathematics (University of Warwick), 1996. Supervisor: Roger Carter.
- Postgraduate Certificate in Learning and Teaching in Higher Education (University of Leicester), 2001.
- MSc Mathematics, with distinction (University of Warwick), 1994.
- BA Mathematics, First (Oxford University), 1992.

Research activities

Research grants awarded

- Leadership Fellowship, *Cluster-tilting theory*.
Engineering and Physical Sciences Research Council, EP/G007497/1.
Principal Investigator (no co-investigator).
Buys out teaching and administration for five years and funds a Research Associate for 33 months.
1 September 2008 - 31 August 2013. Grant value £700921.
- *Cluster algebras and applications*. Engineering and Physical Sciences Research Council, EP/C01040X/1 (Leicester); carried forward as EP/C01040X/2 (Leeds).
Principal Investigator (Co-investigator: J. Scott).
Funds for a Research Associate for 3 years.
1 May 2006 - 31 October 2009. Grant value £170744.
- *Actions of the braid group on derived categories of representations of simple Lie algebras*.
Engineering and Physical Sciences Research Council, GR/S35387/01.
Principal Investigator (Co-investigator: Steffen Koenig).
Funds for one Research Associate for 12 months and one for 24 months.
1 June 2004 - 30 November 2007. Grant value £148289.
- Leverhulme Fellowship, *Applications of canonical bases*.
Leverhulme Trust.
Principal Investigator (no co-investigator).
Funds for a replacement lecturer and travel for grant-holder,
1 January to 31 August 2003. Grant value £18143.
- *Canonical Bases, Reduced Expressions and Normal Forms*.
Engineering and Physical Sciences Research Council, fast stream grant, GR/R17546/01.
Principal Investigator (no co-investigator).
Funds for a Research Associate for 14 months.
22 January 2001 – 21 September 2003. Grant value £52708.
- *Algebraic Groups and Related Topics*, one-day meeting at the University of Warwick.
London Mathematical Society Scheme 1 grant.
Jointly held with Dmitriy Rumynin.
October 1999, Grant value £2275.

Research supervision

Research Fellows

- Yann Palu, September 2009 to August 2011.
- Jeanne Scott, May 2006 to May 2009.
- Karin Baur, July 2005 to August 2007
- Intan Muchtadi-Alamsyah, June 2004 – July 2005.
- Ruth Corran, January 2001 – March 2002.

PhD Students

- Raquel Simoes, April 2008 to present.
- Mark Parsons, October 2003 – September 2007. PhD awarded 2008.

Refereeing and PhD examining

- Editor of the *Glasgow Mathematical Journal* and the *International Electronic Journal of Algebra*.
- Acted as referee for the following journals:

Advances in Applied Mathematics
Advances in Mathematics
Journal of Pure and Applied Algebra
Algebras and Representation Theory
Annals of Mathematics
Bulletin of the London Mathematical Society
Central European Journal of Mathematics
Compositio Mathematica
Proceedings of the London Mathematical Society
International Mathematical Research Notices
Journal of Algebra
Journal of Algebraic Combinatorics
Journal of the London Mathematical Society
Proceedings of the American Mathematical Society
Transactions of the American Mathematical Society

Journal of Mathematical Physics
Algebra Colloquium
Algebra and Number Theory
Pacific Journal of Mathematics
Bulletin of the Australian Mathematical Society
Proceedings of the American Mathematical Society
Proceedings of the Edinburgh Mathematical Society
Duke Mathematical Journal
European Journal of Combinatorics
Representation Theory
Selecta Mathematica
Transactions of the American Mathematical Society
Transformation Groups
Proceedings of the International Congress of Mathematicians

- PhD examiner (2 external and 3 internal).
- Reviewer for *Zentralblatt MATH*.

Conference/workshop organisation

- External adviser for conference on *Cluster categories and cluster tilting*, to take place at the NTNU, Trondheim, Norway, March 2012.
- Joint organiser of one-day meeting on *Cluster Algebras and Representation Theory*, University of Leeds, UK, June 2010.
- Joint organiser of two-day workshop on *Quivers and Integrable Systems*, University of Leeds, UK, May 2009.
- Joint organiser of conference PFS 2008 on *Rings and Modules*, Lisbon, Portugal, September 2008.
- Organiser of two-day *ARTIN* meeting (*Algebra and Representation Theory in the North*), University of Leeds, March 2008.
- Scientific adviser for *Liegrits Workshop* on categorification, cluster theory and other topics, Oxford, UK, January 2008.
- Joint organiser of one-day meeting on *Algebraic Groups and Related Topics*, held at the University of Warwick, UK, October 1999.

Invited conference presentations

- Cluster categories and cluster tilting, NTNU, Trondheim, Norway, 28-30 March 2012.
- Workshop on cluster algebras and combinatorics 2012, University of Graz, Austria, 8-10 March 2012.
- New developments in noncommutative algebra and its applications, Sabhal Mòr Ostaig, Isle of Skye, Scotland (ICMS conference), June-July 2011.
- The Abel Symposium 2011: Algebras, quivers and representations, June 2011.

- Representation theory of quivers and finite dimensional algebras, Mathematics Research Institute (MFO), Oberwolfach, Germany, February 2011.
- Homological and geometric methods in algebra, NTNU, Trondheim, Norway, August 2009.
- LMS Durham Symposium on Combinatorial and geometric structures in representation theory, Durham, UK in July 2009.
- Bristol, Leicester, Oxford Colloquium/REPNET meeting, University of Leicester, UK, July 2009.
- Mini-workshop on “Total non-negativity is a quantum phenomenon”, Mathematics Research Institute (MFO), Oberwolfach, Germany, March 2009.
- LMS Workshop on Triangulated categories, Swansea, UK, December 2008.
- Representation theory of finite dimensional algebras, Mathematics Research Institute (MFO), Oberwolfach, Germany, February 2008.
- Plenary talk at the XII International Conference on Representation Theory (ICRA XII), Torun, Poland, August 2007.
- Perspectives in Auslander-Reiten Theory, NTNU, Trondheim, Norway, May 2007.
- Themes in the interface of representation theory and physics. Conference and Workshop, City University, London, UK, December 2006.
- Cluster algebras and cluster-tilted algebras, University of Bielefeld, Germany, May 2006.
- Sixth Century Conference on Representation Theory, University of Aberdeen, UK, October 2005.
- Series of talks at the masterclass on Cluster Algebras, Luminy, France, May 2005.
- Representation theory of finite dimensional algebras, Mathematics Research Institute (MFO), Oberwolfach, Germany, February 2005.
- Morning talk at the British Mathematical Colloquium/Irish Mathematical Society Meeting in Belfast, Northern Ireland, April 2004.
- Meeting on Representations of Finite-Dimensional Algebras at the University of Warwick, UK, December 2003.
- Summer School on Group Representations, Centre for Linear Structures and Combinatorics, Lisbon, Portugal, July 2003 (3 talks).
- American Mathematical Society meeting at Northeastern University, Boston, USA, October 2002.
- Journée d’algèbre (Algebra day) at the University of Caen, France, May 2002.
- Meeting on Algebraic Lie Representations (Path Algebras, Combinatorial Methods and Symmetries), Bielefeld, Germany, February 2002.
- Representation Theory Around the Channel, Université de Picardie, Amiens, France, August 2001.
- Mini-workshop on Schur algebras and quantum groups, Mathematics Research Institute (MFO), Oberwolfach, Germany, February - March 2001.
- LMS Durham Symposium on Quantum Groups, University of Durham, UK, July 1999.
- Enveloping Algebras, Quantum Groups and Representation Theory, Bielefeld, Germany, September 1996.

- Meeting on Groupes Algébriques de Transformations, Luminy, France, October 1996.

Invited seminar talks

- University of Leicester, UK, December 2011, From triangulated categories to module categories via localisation.
- University of Bielefeld, Germany, October 2011, Cluster presentations of reflection groups.
- University of Bristol, UK, October 2011, From triangulated categories to module categories via localisation.
- École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, April 2011, From triangulated categories to module categories via localisation.
- Institute for Mathematical Research (FIM), ETH, Zürich, Switzerland, March 2011, Trees of relations, clusters and RNA structures.
- NTNU, Trondheim, Norway, January 2011, A geometric model of tube categories.
- NTNU, Trondheim, Norway, January 2011, Trees of relations, clusters and RNA secondary structures.
- University of Bath, UK, December 2010, Cluster mutation-periodic quivers and associated Laurent sequences.
- Lancaster University, UK, June 2010, Categorifying the determinant of a frieze pattern of integers.
- University of York, UK, January 2010, Cluster mutation-periodic quivers and associated Laurent sequences.
- University of Manchester, UK, October 2009, Cluster mutation-periodic quivers and associated Laurent sequences.
- NTNU, Trondheim, Norway, September 2009, Tiling bijections between paths and Brauer diagrams.
- NTNU, Trondheim, Norway, September 2009, Total positivity and cluster algebras.
- University of Bergen, Norway, August 2009, An introduction to cluster algebras.
- ETH, Zurich, Switzerland, June 2009, Two introductory talks on cluster algebras.
- University of Sheffield, UK, March 2009, Pure mathematics colloquium, Cluster structures from 2-Calabi-Yau categories with loops.
- University of Coimbra, Portugal, March 2008, A geometric construction of m -cluster categories.
- University of Kent at Canterbury, November 2007, A geometric construction of m -cluster categories.
- University of York, Leeds-York Lie Theory seminar, November 2007, Parametrizations of flag varieties.
- ETH, Zurich, Switzerland, October 2007, Cluster-tilting theory.
- University of Glasgow, UK, October 2007, Catalan sets, Pascal arrays and towers of algebras.
- University of Newcastle, Artin meeting, October 2007, Denominators of cluster variables.
- University of Bristol, UK, October 2007, A geometric construction of m -cluster categories.

- University of Oxford, UK, April 2007, Catalan sets, Pascal arrays and towers of algebras.
- University of Aberdeen, UK, April 2007, Cluster-tilting theory.
- University of Newcastle, UK, November 2006, A geometric construction of m -cluster categories.
- University of Lisbon (Centro de Algebra da Universidade de Lisboa). Portugal, November 2006, Series of five talks on cluster algebras.
- NTNU, Trondheim, Norway, August 2006, A geometric description of m -cluster categories.
- University of Glasgow, UK, January 2006, Cluster-tilting theory.
- University of Leeds, UK, October 2005, Cluster-tilted algebras.
- One-day workshop on Hopf algebras and Hopf algebroids, University of Warwick, UK, October 2005, Cluster-tilting theory.
- University of Trondheim, Norway, August 2005, The canonical basis and degenerations of quivers.
- One-day workshop on the Representation theory of finite groups and finite-dimensional algebras, University of Hanover, Germany, July 2004.
- University of Paderborn, Germany, July 2004.
- Seminaire Chevalley, Institute Henri Poincare, Paris, France, June 2003.
- Lyon I, France, May 2003.
- University of Trondheim, Norway, April 2003.
- UIA Antwerp, Belgium, March 2003.
- Kings College, London, UK, March 2003.
- Queen Mary College, London, UK, February 2003.
- Northeastern University, Boston, USA, October 2002.
- City University, London, UK, March 2002.
- University of Manchester, UK, February 2002.
- University of Wuppertal, Germany, April and October 2001.
- University of Warwick (Noncommutative geometry and quantum groups one-day meeting), UK, March 2001.
- University of Leeds, UK, October 2001.
- Queen Mary and Westfield College, UK, March 2000.
- University of Edinburgh, UK (Scottish Algebra Day), May 2000.
- University of Wuppertal, Germany, April 1999.

- University of Leeds, UK, November 1998.
- University of Cambridge, UK, May 1997.
- University of Sheffield, UK, February 1997.
- University of Edinburgh, UK, September 1997.
- University of Strasbourg, France, November 1995.

Research visits

- University of Leicester, UK (Sibylle Schroll), 5 weeks of short visits 2009-2011.
- Kings College, London, UK (Konstanze Rietsch), 5 weeks of short visits, October-December 2010.
- University of Bielefeld, Germany (Henning Krause), 2 weeks, October 2011.
- NTNU, Trondheim, Norway (Aslak Bakke Buan), 9 days, June 2011.
- Institute for Mathematical Research (FIM), ETH, Zürich (Karin Baur), 3 months, February-June 2011.
- NTNU, Trondheim, Norway (Aslak Bakke Buan), 2 weeks, January 2011.
- Kings College, London, UK (Konstanze Rietsch), two weeks, May 2010.
- Kings College, London, UK (Konstanze Rietsch), one week, November 2009.
- NTNU, Trondheim, Norway, six weeks, August-September 2009.
- Institute for Mathematical Research (FIM), ETH, Zürich (Karin Baur), two weeks, June 2009.
- Kings College, London, UK (Konstanze Rietsch), 4 days, June 2009.
- Lyon 1, France (Philippe Caldero), one week, November 2008.
- Kings College, London, UK (Konstanze Rietsch), two weeks, June-July 2008.
- ETH, Zurich, Switzerland (Karin Baur), 10 days, October-November 2007.
- Cambridge, UK, (Konstanze Rietsch), 10 days, March-April 2007.
- Trondheim, Norway, (Idun Reiten and Aslak Buan), one week, August 2006.
- Trondheim, Norway, (Idun Reiten and Aslak Buan), two weeks, August 2005.
- Kings College, London, UK (Konstanze Rietsch), two days, March 2005.
- Paderborn, Germany (Henning Krause), one week, July 2004.
- Wuppertal, Germany (Markus Reineke), one week, January 2004.

- Aarhus, Denmark (Catharina Stroppel). Five days, November 2003.
- Lyon I, France (Philippe Caldero), three weeks, May 2003.
- Trondheim, Norway (Aslak Bakke Buan and Idun Reiten), two weeks, April 2003.
- Kings College, London, UK (Konstanze Rietsch), 2 months, January-March 2003.
- Northeastern University, Boston, USA (Andrei Zelevinsky) three weeks, October 2002.
- Institute Henri Poincaré, Paris (Ruth Corran), France: one week, June 2002; two months, October-December 2002; one month, June-July 2003.
- Université de Caen, France (Shmuel Zelikson), one week, May 2002.
- Wuppertal, Germany (Markus Reineke), one week, October-November 2001.
- Cambridge, UK (Konstanze Rietsch), one week, July/August 2001.
- Cambridge, UK (Konstanze Rietsch), one week, July 1999.
- Wuppertal, Germany (Markus Reineke), one week, April 1999.
- Isaac Newton Institute, Cambridge, UK (Roger Carter) one week, May 1997.
- University of Bielefeld, Germany (Claus Michael Ringel), 2.5 months, October-December 1995.

Publication List

Articles in refereed journals.

- [A1] A. P. Fordy and R. J. Marsh. Cluster mutation-periodic quivers and associated Laurent sequences. *Journal of Algebraic Combinatorics*, 34, no. 1 (2011), 19-66.
- [A2] R. J. Marsh and P. Martin. Tiling bijections between paths and Brauer diagrams. *Journal of Algebraic Combinatorics*. Online First, September 2010. DOI: 10.1007/s10801-010-0252-6.
- [A3] A. B. Buan and R. J. Marsh. Denominators in cluster algebras of affine type. *Journal of Algebra*, 323 no. 8, (2010), pages 2083-2102.
- [A4] A. B. Buan, R. J. Marsh and D. F. Vatne. Cluster structures from 2-Calabi-Yau categories with loops. *Mathematische Zeitschrift* 265 no. 4 (2010), pages 951-970.
- [A5] A. B. Buan, R. J. Marsh and I. Reiten. Denominators of cluster variables. *Journal of the London Mathematical Society* 79, no. 3 (2009), pages 589-611.
- [A6] K. Baur and R. J. Marsh. Frieze patterns for punctured discs. *Journal of Algebraic Combinatorics* 30, Issue 3 (2009), Pages 349-379.
- [A7] K. Baur and R. J. Marsh, A geometric description of m -cluster categories, *Transactions of the American Mathematical Society* 360, no. 11 (2008), 5789-5803.

- [A8] A. B. Buan, R. J. Marsh and I. Reiten, Cluster mutation via quiver representations, *Commentarii Mathematici Helvetici* 83, no. 1 (2008), 143-177.
- [A9] K. Baur and R. J. Marsh, A geometric description of the m -cluster categories of type D_n , *International Mathematics Research Notices* Volume 2007, article ID rnm011, 19 pages, doi:10.1093/imrn/rnm011, 2007.
- [A10] A. B. Buan, R. J. Marsh, I. Reiten and G. Todorov, Clusters and seeds in acyclic cluster algebras, Includes appendix by A. B. Buan, R. J. Marsh, P. Caldero, B. Keller, I. Reiten and G. Todorov, *Proceedings of the American Mathematical Society* 135, no. 10 (2007), 3049-3060.
- [A11] A. B. Buan, R. J. Marsh and I. Reiten, Cluster-tilted algebras, *Transactions of the American Mathematical Society* 359, no. 1 (2007), 323-332.
- [A12] A. B. Buan, R. J. Marsh and I. Reiten, Cluster-tilted algebras of finite representation type, *Journal of Algebra* 306, no. 2 (2006), 412-431.
- [A13] A. B. Buan, R. J. Marsh, M. Reineke, I. Reiten and G. Todorov, Tilting theory and cluster combinatorics, *Advances in Mathematics* 204, no. 2 (2006), 572-618.
- [A14] P. Caldero, R. J. Marsh and S. Morier-Genoud, Realisation of Lusztig cones, *Representation Theory* 8 (2004), 458-478.
- [A15] R. J. Marsh and K. Rietsch, Parametrizations of flag varieties, *Representation Theory* 8 (2004), 212-242.
- [A16] P. Caldero and R. J. Marsh, A multiplicative property of quantum flag minors II, *Journal of the London Mathematical Society* 69, Series 2, no. 3 (2004), 608-622.
- [A17] R. J. Marsh and M. Reineke, Canonical basis linearity regions arising from quiver representations, *Journal of Algebra* 270, no. 2 (2003), 696-727.
- [A18] R. J. Marsh, M. Reineke and A. Zelevinsky, Generalized associahedra via quiver representations, *Transactions of the American Mathematical Society* 355, no. 10 (2003), 4171-4186.
- [A19] R. J. Marsh and K. Rietsch, The intersection of opposed big cells in the real flag variety of type G_2 , *Proceedings of the London Mathematical Society* 85, Series 3, no. 1 (2002), 22-42.
- [A20] R. J. Marsh, Rectangle diagrams for the Lusztig cones of quantized enveloping algebras of type A, *Journal of Algebra* 249, no.2 (2002), 377-401.
- [A21] R. J. Marsh, The Lusztig cones of quantized enveloping algebras of type A, *Journal of Algebra* 244, no.1 (2001), 59-75.
- [A22] R. W. Carter and R. J. Marsh, Regions of linearity, Lusztig cones and canonical basis elements for the quantized enveloping algebra of type A_4 , *Journal of Algebra* 234, no.2 (2000), 545-603.
- [A23] R. J. Marsh, More tight monomials for quantized enveloping algebras, *Journal of Algebra* 204, no.2 (1998), 711-732.
- [A24] R. J. Marsh, Canonical bases and standard monomials, *Proceedings of the Edinburgh Mathematical Society*

41, Series II, no.3 (1998), 611-623.

[A25] R. M. Green and R. J. Marsh, Quantized symmetric powers, Quarterly Journal of Mathematics 48, Series 2, no. 192 (1997), 479-492.

[A26] R. J. Marsh, Canonical bases for fundamental modules of quantized enveloping algebras of type A, Communications in Algebra 25, no.5 (1997), 1365-1386.

[A27]. R. J. Marsh, Canonical bases for the miniscule modules of the quantized enveloping algebras of type B and D, Communications in Algebra 25, no.5 (1997), 1387-1411.

[A28] R. J. Marsh, Algorithms to obtain the canonical basis in some fundamental modules of quantum groups, Journal of Algebra 186, no. 3 (1996), 831-860.

Other articles, preprints etc:

Proceedings

K. A. Brown, P. A. Guil Asensio and R. J. Marsh (editors), Proceedings of the Rings and Modules Conference, Lisbon, Portugal, September 2008, in honour of Patrick F. Smith's 65th Birthday. Volume 52A of the Glasgow Mathematical Journal (Chief Editor, Ian Strachan), July 2010.

Expository articles

R. W. Carter and R. J. Marsh. Canonical bases and piecewise-linear combinatorics, Editor: A. Pressley, Quantum Groups and Lie Theory (Durham, 1999), London Mathematical Society Lecture Note Series 290, Pages 33-47, Cambridge, UK, Cambridge University Press, 2001.

A. B. Buan and R. J. Marsh, Cluster-tilting theory, Editors: J. A. de la Pena and R. Bautista, Trends in Representation Theory of Algebras and Related Topics, Workshop August 11-14, 2004, Queretaro, Mexico, Contemporary Mathematics 406, Pages 1-30, Providence, RI, USA, American Mathematical Society, 2006.

Preprints (to appear)

[P1] A. B. Buan and R. J. Marsh. From triangulated categories to module categories via localisation II: Calculus of fractions. Preprint, February 2011. To appear in J. Lond. Math. Soc.

[P2] A. B. Buan and R. J. Marsh. From triangulated categories to module categories via localisation. Preprint, October 2010. To appear in Trans. Amer. Math. Soc.

Other preprints

[P3] M. Barot and R. J. Marsh. Reflection group presentations arising from cluster algebras. Preprint, December 2011.

[P4] R. J. Marsh and Y. Palu. Coloured quivers for rigid objects and partial triangulations: The unpunctured case. Preprint, December 2010.

[P5] K. Baur and R. J. Marsh. A geometric model of tube categories. Preprint, November 2010.

[P6] R. J. Marsh and S. Schroll. RNA secondary structures, polygon dissections and clusters. Preprint, October 2010.

[P7] K. Baur and R. J. Marsh. Categorification of a frieze pattern determinant. Preprint, August 2010.

[P8] R. J. Marsh and P. P. Martin. Pascal arrays: counting Catalan sets. Preprint, December 2006.

All preprints are available from <http://www.maths.leeds.ac.uk/~marsh>.