
Richard Hepworth

Curriculum Vitae

Personal Information

Richard Antony Hepworth
Born 21st January 1980
British Citizen

Contact

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Employment

2011- **Lecturer**, University of Aberdeen

2009-11 **Postdoctoral Researcher**, University of Copenhagen

2006-09 **E.P.S.R.C. Postdoctoral Research Fellow**, University of Sheffield

2005-06 **Lecturer** (fixed term), University of Edinburgh

Education

2002-06 **Ph.D, University of Edinburgh.** Doctoral Thesis *Generalized Kreck-Stolz invariants and the topology of certain 3-Sasakian 7-manifolds* supervised by Professor Elmer Rees.

2001-02 **Part III, University of Cambridge.** Distinction.

1998-01 **B.A. Mathematics, University of Cambridge.** First class honours.

Research Interests

Algebraic topology, in particular string topology, operads, field theories and related structures.

Papers

A homology theory for graphs.

Joint with Simon Willerton. In preparation.

Homological stability for families of Coxeter groups.

Submitted. [arXiv:1502.03128](#).

On string topology of classifying spaces. Joint with Anssi Lahtinen.

Submitted. [arXiv:1308.6169](#).

Configuration spaces and Θ_n . Joint with David Ayala.

Proceedings of the American Mathematical Society, 142 (2014), no. 7, 2243-2254. [arXiv:1202.2806](#).

Groups, cacti and framed little discs.

Transactions of the American Mathematical Society, 365(2013), 2597 - 2636. [arXiv:1009.3260](#).

String topology for complex projective spaces.

[arXiv:0908.1013](#).

String topology for Lie groups.

Journal of Topology, Vol. 3, No. 2, 2010, pp. 424-442.

[arXiv:0905.1199](#)

Vector Fields and Flows on Differentiable Stacks.

Theory and Applications of Categories, Vol. 22, No. 21, 2009, pp. 542-587.

[arXiv:0810.0979](#)

Morse Inequalities for Orbifold Cohomology.

Algebraic & Geometric Topology, Vol. 9, 2009, pp. 1105-1175.

[arXiv:0712.2432](#)

The age grading and the Chen-Ruan cup product.

Bulletin of the London Mathematical Society, Vol. 42, No. 5, 2010, pp. 868-

878. [arXiv:0706.4326](#)

The topology of certain 3-Sasakian 7-manifolds. Mathematische Annalen, Volume 339, Number 4, December 2007.

[arXiv:math/0511735](#)

Generalized Kreck-Stolz invariants and the topology of certain 3-Sasakian 7-manifolds. Ph.D Thesis, University of Edinburgh, 2005. Unpublished. Available from my homepage.

Conferences and Seminars Organized

- 2013- **Scottish Topology Seminar**
Collaborative venture between topologists in Aberdeen, Edinburgh and Glasgow. Three day-long meetings per year. Funded by £3000 grant from Glasgow Mathematical Journal.
- September 2013 **British Topology Meeting 2013**
University of Aberdeen, 9-11 September 2013
Sole organiser of the 2013 edition of this annual conference with 7 invited speakers, 6 contributed talks, 35 participants. Grants of £5000 from London Mathematical Society, £1000 from Glasgow Mathematical Journal, £800 from Edinburgh Mathematical Society.
- April 2013 **Workshop on String Topology and Related Topics**
Copenhagen University, April 15-19 2013
Week-long workshop with 27 participants. Jointly organised with Anssi Lahti-nen.
- 2012-13 **Topology Seminar**, University of Aberdeen. Fortnightly seminars.
- 2011-12 **Topology Seminar**, University of Aberdeen. Fortnightly seminars.
- 2010-11 **Topology Seminar**, University of Copenhagen. Weekly seminars jointly organized with Alexander Berglund and Oscar Randal-Williams.
- January 2010 **Copenhagen Topology Conference 2010.**
Copenhagen University, 8-10 January 2010.
Committee: R. Cohen, J. Grodal, R. Hepworth, I. Madsen, A. Stacey, N. Wahl.
- 2008-09 **Topology Seminar**, University of Sheffield. Weekly seminars jointly organized with Shoham Shamir.
- 2007-08 **Topology Seminar**, University of Sheffield. Weekly seminars jointly organized with Constanze Roitzheim.
- September 2007 **22nd British Topology Meeting.**
Sheffield, 10-12 September 2007.
Supported by grants from the London Mathematical Society and University of Sheffield. *Committee:* R. Hepworth, R. Sanchez, J. Sigurdsson, A. Stacey.

- Invited Talks**
- Loop spaces in geometry and topology.**
Nantes, 1-5 September 2014.
Three lectures on String topology of classifying spaces.
- Homological methods in algebra, geometry and physics.**
City University London, 23-25 July 2014.
String topology of classifying spaces.
- GDR topologie algébrique et applications.**
Angers, 16-18 October 2013.
String topology of classifying spaces.
- Algebraic Topology: Applications and New Directions.**
Stanford, 23-27 July 2012.
String topology of classifying spaces.
- 4th Sheffield Homotopy Miniconference.**
20-22 January, 2012.
String topology of classifying spaces.
- Bergen Topology Symposium 2010.**
10-11 June 2010.
Groups, Cacti and Framed Little Discs.
- Copenhagen Topology Conference 2010.**
8-10 January 2010.
Groups, Cacti and Framed Little Discs.
- Topological and Differentiable Stacks.**
1-5 April 2008, Centre de Recerca Matemàtica, Barcelona.
Orbifold Morse Inequalities and Orbifold Morse-Smale-Witten Theory.
- Cohomologie d'Orbifold.**
Nantes, 20 December 2007.
Morse Theory and Orbifold Cohomology.

Contributed Talks

- 26th British Topology Meeting.**
Edinburgh, 1-3 September 2011.
Configuration spaces and Higher Categories.
- 25th British Topology Meeting.**
Oxford, 6-8 September 2010.
Groups, cacti and framed little discs.
- Strings in Copenhagen.**
Copenhagen, 15-19 February 2010.
Higher String Topology Operations.
- British Mathematical Colloquium 2005.**
Liverpool, 5-7 April 2005.
Generalized Kreck-Stolz Invariants.

Seminars

- 2015 Edinburgh.
- 2013 Stockholm, Copenhagen, Belfast.
- 2012 Oxford, Glasgow, Copenhagen.
- 2011 Aarhus, Aberdeen, Lille.
- 2010 Sheffield, Swansea, Edinburgh, Manchester, Aberdeen.
- 2009 Durham, Manchester, Sheffield.
- 2008 Imperial College London, I.S.T. Lisbon, Sheffield, Leicester, Aberdeen.
- 2007 Edinburgh, Glasgow, Leeds, Manchester, Sheffield.
- 2006 Glasgow, Sheffield.
- 2005 Edinburgh, Heidelberg.

Conferences Attended**Topologie.**

Oberwolfach, 14-20 September 2014.

Loop spaces in geometry and topology.

Nantes, 1-5 September 2014.

Homological methods in algebra, geometry and physics.

City University London, 23-25 July 2014.

GDR topologie algébrique et applications.

Angers, 16-18 October 2013.

British Topology Meeting 2013.

Aberdeen, 9-11 September 2013.

Algebraic Topology: Applications and New Directions.

Stanford, 23-27 July 2012.

4th Sheffield Homotopy Miniconference.

20-22 January, 2012.

Bergen Topology Symposium 2010.

10-11 June 2010.

Operator Algebras and Conformal Field Theory.

Oregon, 16-21 August 2010.

West Coast Algebraic Topology Summer School.

Oregon, 9-14 August 2010.

Young Topologists' Meeting 2010.

Copenhagen, 16-20 June 2010.

Copenhagen Topology Conference 2010.

Copenhagen, 8-10 January 2010.

Conference and Workshop on Topological Field Theories.

Northwestern, 18-29 May 2009.

Geometry and Physics: Atiyah 80.

Edinburgh, 20-22 April 2009.

Higher Structures in Mathematics and Physics.

Lausanne, 3-7 November 2008.

Algebraic Structures in Geometry and Physics.

Leicester, 21-25 July 2008.

String Topology and the Topology of Moduli Spaces.

Stanford University, 24-27 March 2008.

British Mathematical Colloquium.

Swansea, 16-19 April 2007.

Journal of Topology Launch Meeting.

Oxford, 19-21 March 2007.

21st British Topology Meeting.
Gregynog, 11-13 September 2006.

Sheffield Homotopy Miniconference.
Sheffield, 11-14 January 2006.

20th British Topology Meeting.
Bristol, 12-14 September 2005.

Administrative duties in Aberdeen

- 2013- Examinations officer for mathematics.
- 2012- Aberdeen representative on SMSTC's Academic Steering and Management Group.
- 2012-14 Promotions officer for mathematics.
- 2012-14 Adviser of studies.

Service

- December 2013 External examiner for Copenhagen Ph.D. thesis of Angela Klamt.
- October 2013 Internal examiner for Ph.D. thesis of Oldrich Spacil.
- November 2012 Internal examiner for Ph.D. thesis of Ayse Borat.
- 2011-14 Contributor to Mathematical Reviews.
- 2011- Peer reviewer for *Transactions of the American Mathematical Society*, *Geometry and Topology*, *Algebraic and Geometric Topology*, *Journal of Topology*, *International Mathematics Research Notices*.

Professional Organisations

I am a member of the *London Mathematical Society* and the *Edinburgh Mathematical Society*.

Supervision

2014- PhD supervisor of Rachael Boyd.

Teaching

2014-15 *Calculus I*. Course organiser. 33 hours of lectures to around 150 undergraduates from a range of subjects.

Knots. Course organiser. 22 hours of lectures to around 20 mathematics undergraduates.

Undergraduate Project Supervisor.

2013-14 *Knots*. Course organiser. 24 hours of lectures to around 25 mathematics undergraduates.

Algebraic Topology. Course organiser. 24 hours of lectures to around 25 mathematics undergraduates.

Undergraduate Project Supervisor.

2012-13 *Sets and Algebraic Structures*. Course organiser. 36 hours of lectures to around 60 mathematics undergraduates.

Knots. Course organiser. 24 hours of lectures to around 25 mathematics undergraduates.

SMSTC Geometry and Topology. Lecturer. 6 hours specialised postgraduate-level lectures for PhD students around Scotland.

Masters Dissertation Supervisor. Supervised one masters project in summer 2013.

Undergraduate Project Supervisor.

2011-12 *Sets and Algebraic Structures*. Course organiser. 36 hours of lectures to around 60 mathematics undergraduates.

Knots. Course organiser. 24 hours of lectures to around 15 mathematics undergraduates.

Undergraduate Project Supervisor.

2010-11 *Mathematical Modelling*. Lecturer.

Topology. 40 hours of lectures to around 40 mathematics undergraduates.

Bachelor project supervisor.

2009-10 *Categories and Topology*. Weekly exercise class with around 10 masters students.

Mathematical Modelling. Lectures for around 40 undergraduates with varied background.

2007-09 *Metric Spaces*. Course of 20 lectures to approximately 50 third year undergraduates.

2005-06 *Probability for Chemical Engineers*. Course of 12 lectures to approximately 40 second year undergraduates.

Mathematical Communication and Computing. MAPLE labs and lecture mini-course to approximately 60 third year mathematics undergraduates.

Applied Mathematics 1. Mathematics lectures to approximately 200 first year Physical Scientists & Engineers.

2002-05

Undergraduate Tutor. Weekly example sessions for classes of 12 first and second year undergraduates.

Aberdeen, January 2015