

Peter Keevash

Affiliation

Professor of Mathematics, School of Mathematical Sciences, Queen Mary, University of London, Mile End Road, London E1 4NS, UK. Email: p.keevash@qmul.ac.uk. Tel: +44 (0)20 7882 5447.

Research interests

Extremal Combinatorics, Graph Theory, Hypergraphs / Set Systems, Algebraic and Probabilistic Methods in Combinatorics, Random Structures, Combinatorial Optimisation, Combinatorial Geometry, Combinatorial Number Theory.

Education

2000 – 2004	Ph. D. in Mathematics, Princeton University, Princeton, NJ, USA.
1999 – 2003	Ph. D. in Mathematics, Trinity College, Cambridge, UK.
1998 – 1999	Certificate of Advanced Study in Mathematics (Part III) with distinction, Trinity College, Cambridge, UK.
1995 – 1998	BA in Mathematics with first class in all years, Trinity College, Cambridge, UK.

Grants

2010 – 2015	European Research Council Starting Grant 239696.
2009 – 2012	Engineering and Physical Sciences Research Council (UK) grant EP/G056730/1.
2006 – 2009	National Science Foundation (USA) grant DMS-0555755.

Honours and awards

2009	European Prize in Combinatorics, Bordeaux, France.
2004	SIAM Student Travel Award, USA.
1997	Senior Scholar, Trinity College, Cambridge, UK.
1996	Junior Scholar, Trinity College, Cambridge, UK.
1995	Bronze medal, International Mathematical Olympiad, Toronto, Canada.

Academic and professional experience

2010 – 2011	Reader in Pure Mathematics, School of Mathematical Sciences, Queen Mary, University of London, London, UK.
2007 – 2010	Lecturer in Pure Mathematics, School of Mathematical Sciences, Queen Mary, University of London, London, UK.
August 2007	Research Fellow, School of Mathematics, University of Birmingham, UK.
2004 – 2007	Olga Taussky - John Todd Instructor, Department of Mathematics, Caltech, Pasadena, CA, USA.
2000 – 2004	Teaching Assistant, Department of Mathematics, Princeton University, USA.
1999 – 2000	Undergraduate supervisor, Trinity College, Cambridge, UK.
Summer 1999	Summer intern, BRIMS research, Hewlett-Packard Laboratories, Bristol, UK.

Teaching

Berlin: Differential Equation Methods for Stochastic Processes (Doc-Course).

QMUL: Regularity of graphs and hypergraphs (mini-course), Algorithmic Graph Theory (twice), Extremal Combinatorics, Cryptography (co-organiser).

Caltech: Number Theory for Beginners, Combinatorial Analysis (introductory), Combinatorial Number Theory, Combinatorial Analysis (Extremal Combinatorics with applications to Computer Science), Introduction to Discrete Mathematics, Combinatorial Analysis (The Probabilistic Method), Combinatorial Analysis (introductory).

Professional service

Section editor for Discrete Mathematics and Theoretical Computer Science, referee for journals and grant proposals, co-organiser of London Combinatorics Colloquia 2011, co-organiser of Caltech Combinatorics Seminar (2004 – 2007), contributed lectures and workshops for Goldsmiths' mathematics course for teachers (2008 – 2010), Departmental Study Abroad Adviser (2008 – 2009), Outreach to schools, mentor for undergraduate research projects, PhD examiner (3 theses).

Recent talks at seminars and conferences

2011

American Institute of Mathematics workshop on Hypergraph Turán Problems, Palo Alto, CA, USA.

Probabilistic and Structural Graph Theory, McGill Bellairs Institute, Holetown, Barbados.

Combinatorics Study Group, Queen Mary, University of London, UK.

Oberwolfach Combinatorics Meeting, Oberwolfach, Germany.

2010

Heilbronn conference, Bristol, UK.

Extremal and Probabilistic Combinatorics, Frauenchiemsee, Germany.

Rigidity of frameworks and their applications, Lancaster, UK.

Probabilistic Combinatorics, McGill Bellairs Institute, Holetown, Barbados.

DIMAP Seminar, University of Warwick, Coventry, UK.

Combinatorics Seminar, Oxford University, UK.

Combinatorics Seminar, University of Bristol, UK.

2009

Combinatorics: Methods and Applications in Mathematics and Computer Science (core participant, invited workshop speaker, and invited tutorials in IPAM special semester), Los Angeles, CA, USA.

Probabilistic and Extremal Combinatorics Workshop, Banff, Canada.

London Combinatorics Colloquia, London, UK.

Combinatorics, Randomization, Algorithms and Probability Workshop, CRM, Montréal, Canada.

Combinatorics Seminar, Cambridge University, UK.

Combinatorics Seminar, Oxford University, UK.

Publications

1. P. Keevash and D. Mubayi, The Turán number of $F_{3,3}$, submitted.
2. P. Keevash, Hypergraph Turán Problems, to appear in *Surveys in Combinatorics 2011*.
3. B. Jackson and P. Keevash, Necessary conditions for the global rigidity of direction-length frameworks, to appear in *Disc. Comp. Geom.*
4. B. Jackson and P. Keevash, Bounded direction-length frameworks, to appear in *Disc. Comp. Geom.*
5. P. Keevash, D. Kühn, R. Mycroft and D. Osthus, Loose Hamilton cycles in hypergraphs, to appear in *Disc. Math.*
6. P. Keevash, A hypergraph blowup lemma, to appear in *Random Structures Algorithms*.
7. T. Bohman and P. Keevash, The early evolution of the H-free process, *Invent. Math.* **181** (2010), 291–336.
8. P. Keevash and D. Mubayi, Set systems without a simplex or a cluster, *Combinatorica* **30** (2010), 175–200.
9. D. Christofides, P. Keevash, D. Kühn and D. Osthus, A semi-exact degree condition for Hamilton cycles in digraphs, *SIAM J. Disc. Math.* **24** (2010), 709–756.
10. P. Keevash and B. Sudakov, Pancyclicity of Hamiltonian and highly connected graphs, *J. Combin. Theory Ser. B* **100** (2010), 456–467.
11. J. Fox, P. Keevash and B. Sudakov, Directed graphs without short cycles, *Combin. Probab. Comput.* **19** (2010), 285–301.
12. P. Keevash and B. Sudakov, Triangle packings and 1-factors in oriented graphs, *J. Combin. Theory Ser. B* **99** (2009), 709–727.
13. P. Keevash, A hypergraph regularity method for generalised Turán problems, *Random Structures Algorithms* **34** (2009), 123–164.
14. P. Keevash, D. Kühn and D. Osthus, An exact minimum degree condition for Hamilton cycles in oriented graphs, *J. London Math. Soc.* **79** (2009), 144–166.
15. P. Keevash, Shadows and intersections: stability and new proofs, *Adv. Math.* **218** (2008), 1685–1703.
16. P. Keevash and Y. Zhao, Codegree problems for projective geometries, *J. Combin. Theory Ser. B*, **97** (2007), 919–928.

17. P. Keevash, D. Mubayi and R. M. Wilson, Set systems with no singleton intersection, *SIAM J. Disc. Math.*, **20** (2007), 1031–1041.
18. P. Keevash, D. Mubayi, B. Sudakov and J. Verstraëte, Rainbow Turán Problems, *Combin. Probab. Comput.*, **16** (2007), 109–126.
19. J. Balogh, P. Keevash and B. Sudakov, On the minimal degree implying equality of the largest triangle-free and bipartite subgraphs, *J. Combin. Theory Ser. B* **96** (2006), 919–932.
20. R. P. Anstee and P. Keevash, Pairwise intersections and forbidden configurations, *European J. Combin.* **27** (2006), Special Issue on Extremal and Probabilistic Combinatorics, 1235 – 1248.
21. P. Keevash and C. Y. Ku, A random construction for permutation codes and the covering radius, *Des. Codes Cryptogr.* **41** (2006), 79–86.
22. P. Keevash and B. Sudakov, On a restricted cross-intersection problem, *J. Combin. Theory Ser. A* **113** (2006), 1536–1542.
23. P. Keevash, P. Loh and B. Sudakov, Bounding the number of edges in permutation graphs, *Electron. J. Combin.* **13** (2006), R44.
24. P. Keevash and B. Sudakov, Sparse halves in triangle-free graphs, *J. Combin. Theory Ser. B* **96** (2006), 614–620.
25. P. Keevash and B. Sudakov, On a hypergraph Turán problem of Frankl, *Combinatorica* **25** (2005), 673-706.
26. P. Keevash and B. Sudakov, The Turán number of the Fano plane, *Combinatorica* **25** (2005), 561-574.
27. P. Keevash, The Turán problem for projective geometries, *J. Combin. Theory Ser. A* **111** (2005), 289–309.
28. J. Balogh, P. Keevash and B. Sudakov, Disjoint representability of sets and their complements, *J. Combin. Theory Ser. B*, **95** (2005), 12–28.
29. P. Keevash, The Turán problem for hypergraphs of fixed size, *Electron. J. Combin.* **12** (2005), N11.
30. P. Keevash and B. Sudakov, Set systems with restricted cross-intersections and the minimum rank of inclusion matrices, *SIAM J. Discrete Math.* **18** (2005), 713–727.
31. N. Alon, J. Balogh, P. Keevash and B. Sudakov, The number of edge colorings with no monochromatic cliques, *J. London Math. Soc.* **70** (2004), 273–288.
32. P. Keevash and D. Mubayi, Stability theorems for cancellative hypergraphs, *J. Combin. Theory Ser. B* **92** (2004), 163–175.

33. B. Bollobás, P. Keevash and B. Sudakov, Multicoloured extremal problems, *J. Combin. Theory Ser. A* **107** (2004), 295–312.
34. P. Keevash and B. Sudakov, Packing triangles in a graph and its complement, *J. Graph Theory* **47** (2004), 203–216.
35. P. Keevash, M. Saks, B. Sudakov and J. Verstraëte, Multicolour Turán problems, *Adv. in Appl. Math.* **33** (2004), 238–262.
36. P. Keevash and B. Sudakov, On the number of edges not covered by monochromatic copies of a fixed graph, *J. Combin. Theory Ser. B* **90** (2004), 41–53.
37. P. Keevash and B. Sudakov, Local density in graphs with forbidden subgraphs, *Combin. Probab. Comput.* **12** (2003), 139–153.
38. B.M. Hambly, P. Keevash, N. O’Connell and D. Stark, The characteristic polynomial of a random permutation matrix, *Stoch. Proc. Appl.* **90** (2000), 335–346.