

Dr Richard Mycroft PhD

Lecturer in Mathematics

[School of Mathematics \(/schools/mathematics/index.aspx\)](/schools/mathematics/index.aspx)

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About

Richard Mycroft is a Lecturer in Mathematics, whose research interests are primarily in the field of Extremal Combinatorics. In particular, he has worked extensively on embeddings of graphs, directed graphs and hypergraphs, and his work has been recognised by the award of an EPSRC First Grant ("Embeddings in Hypergraphs") to support this programme of research during the period 2015-17.

He regularly publishes research papers in leading mathematics journals, notably including a proof for large tournaments of the well-known Sumner's conjecture (dating from 1971), and a geometric theory for hypergraph matching, giving wide-ranging sufficient conditions for the existence of perfect matchings in uniform hypergraphs.

Richard enjoys communicating his work both in academic circles and to more general audiences. He regularly presents research at high-profile conferences both nationally and internationally, and has delivered many seminars at mathematics departments in the UK, US, Brazil and Hungary. Within the University of Birmingham, Richard currently lectures the first-year mathematics course in Combinatorics.

School web page <http://web.mat.bham.ac.uk/~mycroft/> (<http://web.mat.bham.ac.uk/~mycroft/>)

Qualifications

- PhD in Pure Mathematics, University of Birmingham, 2010
- MMath, University of Cambridge, 2007
- BA (Hons) in Mathematics, University of Cambridge, 2006

Biography

Richard Mycroft read Mathematics at the University of Cambridge, gaining his BA (Hons) degree in 2006 and his MMath degree in 2007. Following this, he moved to the University of Birmingham to complete a PhD under the supervision of Deryk Osthus and Daniela Kühn. His thesis, submitted in 2010, was titled "The regularity method for directed graphs and hypergraphs", with the most notable result being a proof for large tournaments of the well-known Sumner's conjecture, which had been open since 1971.

Following the award of his PhD Richard moved to Queen Mary, University of London, where he spent a year working as a postdoctoral research assistant for Peter Keevash, with the primary focus of his research being the development of a geometric theory for perfect matchings in hypergraphs.

Richard then returned to the University of Birmingham in June 2011 to take up a lectureship in Mathematics. Since then he has continued active research in extremal graph theory, particularly relating to hypergraphs.

Teaching

Teaching Programmes

- G100 Mathematics (BSc)
- G103 Mathematics (Msci)

Postgraduate supervision

Richard Mycroft currently supervises two PhD students, and is keen to hear from any students who are interested in PhD study in Combinatorics.

Research

Richard's research interests lie in the field of Combinatorics, and more specifically in the area of extremal graph theory. In particular he has worked extensively on embedding problems relating to hypergraphs, centred around the development of a geometric theory of perfect matchings in uniform hypergraphs, with multiple subsequent applications both in his own work and the work of other researchers. His research project 'Embeddings in Hypergraphs', supported by a £124k EPSRC First Grant, will continue this programme of research over the period 2015-17.

Aside from Richard's work on hypergraphs, other notable results include a random version of Sperner's theorem on antichains, a multipartite version of the Hajnal-Szemerédi theorem and a proof of the well-known Sumner's conjecture (dating to 1971) for directed trees in large tournaments.

Publications

Richard maintains an up-to-date publications list at <http://web.mat.bham.ac.uk/~mycroft/pubs.htm> (<http://web.mat.bham.ac.uk/~mycroft/pubs.htm>)

