2017 Colloquia in Combinatorics

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Wednesday 10th May 2017 | Thursday 11th May 2017

Queen Mary University of London

Sophie Huczynska (University of St Andrews, UK)
Graph classes under homomorphic image order

Tibor Jordan (Eötvös Loránd University, Budapest, Hungary)
Globally rigid braced triangulations

Kitty Meeks (University of Glasgow, UK)
The complexity of finding and counting sum-free subsets

Oliver Riordan (University of Oxford, UK)
The phase transition in Achlioptas processes

Andrew Treglown (University of Birmingham, UK)
Ramsey properties of the Erdős–Renyi graph and random sets of integers

Uli Wagner (IST Austria, Austria)
Elimination of multiple intersections, and the topological Tverberg conjecture

Venue: Peston Lecture Theatre, The Graduate Centre, QMUL (please note: this is a different venue to that used in 2016; building "18" on the map)

Contacts: Mark Jerrum (m.jerrum@qmul.ac.uk) and Robert Johnson (r.johnson@qmul.ac.uk)

Wednesday 10th May 2017 | Thursday 11th May 2017

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

BIGGS LECTURE: Ronitt Rubinfeld (MIT, Cambridge, USA and Tel-Aviv University, Israel)
Local computation algorithms

Ewan Davies (LSE, UK)
Tight bounds of the coefficients of partition functions via stability

Shoham Letzter (ETH Zürich, Switzerland)
Ramsey theory in directed graphs

Dömötör Pálvölgyi (University of Cambridge, UK)
Coloring geometric hypergraphs

Guillem Perarnau (University of Birmingham, UK)
Critical percolation on random regular graphs

Asaf Shapira (Tel-Aviv University, Israel)
Removal lemmas with polynomial bounds

*(no longer able to attend: **Agelos Georgakopoulos** **(University of Warwick, UK)***
Percolation on infinitely generated groups, and its applications to mafia expansion)

Venue: Sheikh Zayed Theatre, New Academic Building, LSE (please note: this is a different venue to that used in 2016; building "NAB" on the map)

Contact: Julia Böttcher (j.boettcher@lse.ac.uk) and Jozef Skokan (j.skokan@lse.ac.uk)

Supported by

British Combinatorial Committee

LONDON MATHEMATICAL SOCIETY

Event Programme

Two one-day **Colloquia in Combinatorics**

Report on CC2017

2017 sees the **eleventh year** of the Colloquia in Combinatorics: each year, we present a dozen talks covering a wide range of topics of interest to all those working in combinatorics or related fields.

Those interested are welcome to attend for all or any part of the event. The two hosting institutions are less than half an hour apart by tube; it is hoped that many people will be able to attend for both days. There is no formal registration process and seats will be allocated each day on a first come, first served basis.

Queries should be sent to Rebecca Lumb.

Programme

To view the full event programme, including schedule, please click here. You can download this PDF file, for ease of use.

Funding

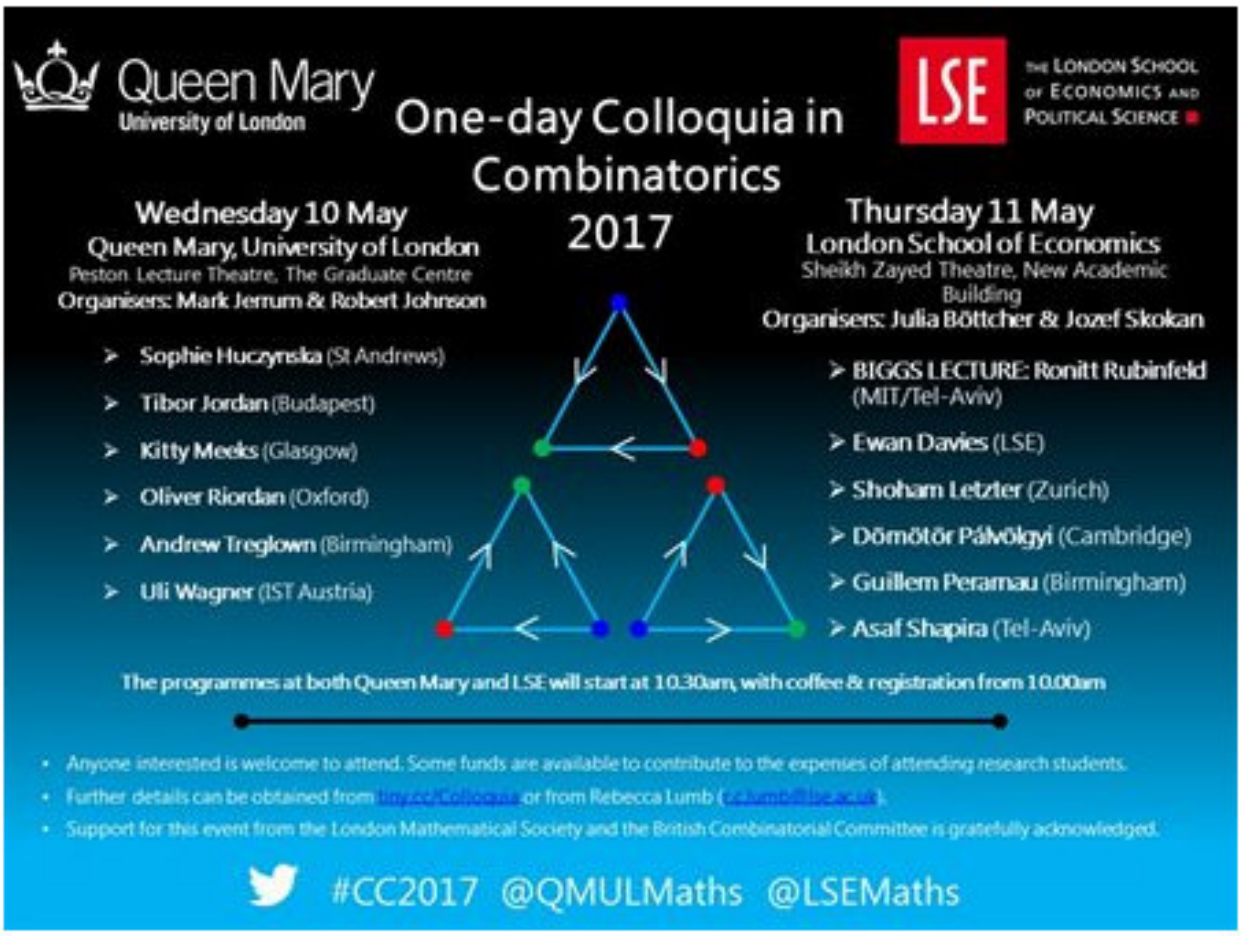
Some funds are available to contribute to the **basic** travel expenses of UK-based research students who wish to attend the meetings. We would ask you to keep costs to a minimum, using public transport on **all** occasions and off-peak student travel tariffs wherever possible. Receipts for all journeys must be maintained as proof of travel. At this stage, we are unable to confirm the maximum amount available; please contact Rebecca Lumb for further information.

There are also some funds available from the London Mathematical Society for help with childcare costs. Further details can be found at http://www.lms.ac.uk/content/childcare-supplementary-grants.

Event Support

Support for this event by the London Mathematical Society and the British Combinatorial Committee is gratefully acknowledged by the organisers.

Event Poster



This poster advertising both days of the event is available to download here. Please do feel free to electronically distribute this to anyone who might be interested, append to local websites (linking back to this site using the URL http://tiny.cc/Colloquia) or print out to share on public notice boards.

Event History

2017 sees the eleventh anniversary of this annual May Colloquium - since 2007, Queen Mary and LSE have held back-to-back one day meetings and details of all past Colloquia can be found as follows:

Colloquia 2016
Colloquia 2015
Colloquia 2014
Colloquia 2013
Colloquia 2012
Colloquia 2011
Colloquia 2010
Colloquia 2009
Colloquia 2008
Colloquia 2007

Queen Mary University of London

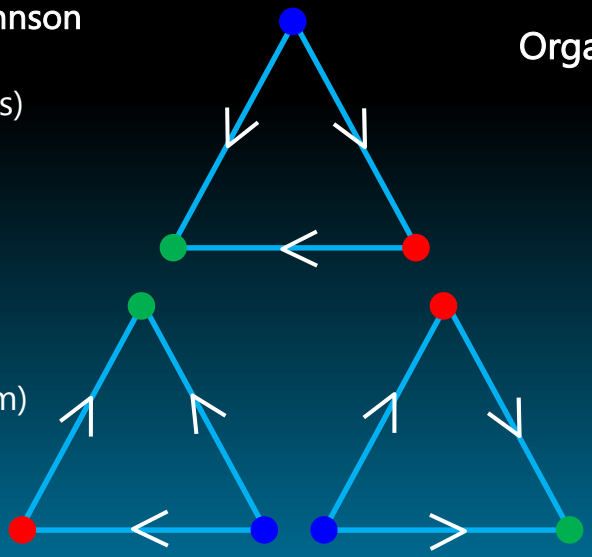
One-day Colloquia in Combinatorics 2017

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Wednesday 10 May
Queen Mary, University of London
Peston Lecture Theatre, The Graduate Centre

Organisers: Mark Jerrum & Robert Johnson

- **Sophie Huczynska** (St Andrews)
- **Tibor Jordan** (Budapest)
- **Kitty Meeks** (Glasgow)
- **Oliver Riordan** (Oxford)
- **Andrew Treglown** (Birmingham)
- **Uli Wagner** (IST Austria)



Thursday 11 May
London School of Economics
Sheikh Zayed Theatre, New Academic Building

Organisers: Julia Böttcher & Jozef Skokan

- **BIGGS LECTURE: Ronitt Rubinfeld** (MIT/Tel-Aviv)
- **Ewan Davies** (LSE)
- **Shoham Letzter** (Zurich)
- **Dömötör Pálvölgyi** (Cambridge)
- **Guillem Perarnau** (Birmingham)
- **Asaf Shapira** (Tel-Aviv)

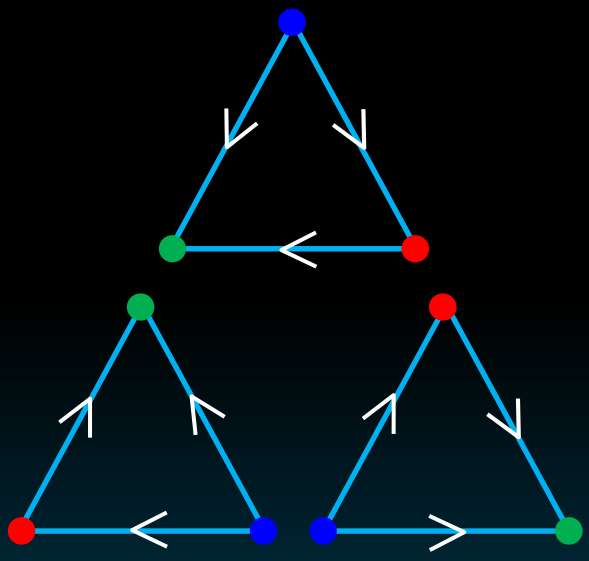
The programmes at both Queen Mary and LSE will start at 10.30am, with coffee & registration from 10.00am

- Anyone interested is welcome to attend. Some funds are available to contribute to the expenses of attending research students.
- Further details can be obtained from tiny.cc/Colloquia or from Rebecca Lumb (r.c.lumb@lse.ac.uk).
- Support for this event from the London Mathematical Society and the British Combinatorial Committee is gratefully acknowledged.

#CC2017 @QMULMaths @LSEMaths

Queen Mary University of London

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE



Two one-day

Colloquia in Combinatorics

10 and 11 May 2017

If attending both days, please keep this programme for day two

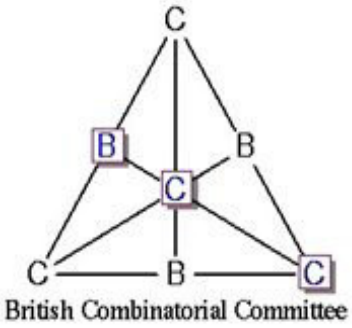
#CC2017 @QMULMaths @LSEMaths

QMUL & LSE have hosted the Colloquia in Combinatorics for the past eleven years.

Thank you for joining us and supporting us through the years.

SUPPORT

Support for this event from the London Mathematical Society (www.lms.ac.uk) and the British Combinatorial Committee (www.britishcombinatorial.wordpress.com) is gratefully acknowledged.



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CONTENTS

INFORMATION

Those interested are welcome to attend for all or any part of the event; it is hoped that many people will be able to attend for both days.

Some funds are available to contribute to the **basic** travel expenses of **UK-based research students** who attend the meetings. We ask you to keep costs to a minimum, using public transport on **all** occasions and off-peak student travel tariffs wherever possible. Receipts for all journeys must be maintained as proof of travel. At this stage, we are unable to confirm the maximum amount available. Expense claim forms are available at the event from the event organisers. Please contact Rebecca Lumb (r.c.lumb@lse.ac.uk) for further information.

Event organisers: Dr Julia Böttcher (LSE), Prof Mark Jerrum (QMUL), Dr Robert Johnson (QMUL) and Prof Jozef Skokan (LSE).

Queen Mary
University of London

WEDNESDAY 10 MAY 2017

Schedule

The first day of the Colloquia in Combinatorics will be held at Queen Mary, University of London, starting at 10.30am. Everyone interested is welcome to attend any part of the event. All the talks will be held in the Peston Lecture Theatre, Graduate Centre, Mile End Campus, QMUL (please note this is a change to last year's venue – listed as 18 on page 7 map). Refreshment breaks will be taken in the Graduate Centre Foyer.

Time	Speaker	Presentation title
10:00	**Coffee** *(Graduate Centre Foyer)*	
10:30	Kitty Meeks (Glasgow)	The complexity of finding and counting sum-free subsets
11:20	Andrew Treglown (Birmingham)	Ramsey properties of the Erdős–Renyi graph and random sets of integers
12:10	**Lunch** *(own arrangements – options on campus and nearby)*	
13:30	Oliver Riordan (Oxford)	The phase transition in Achlioptas processes
14:20	Sophie Huczynska (St Andrews)	Graph classes under homomorphic image order
15:10	**Afternoon tea break** *(Graduate Centre Foyer)*	
15:40	Uli Wagner (IST Austria)	Elimination of multiple intersections, and the topological Tverberg conjecture
16:30	Tibor Jordan (Budapest)	Globally rigid braced triangulations
17:15	**FINISH**	

10:30am **The complexity of finding and counting sum-free subsets**

Kitty Meeks (University of Glasgow)

A set A of natural numbers is said to be sum-free if it does not contain x, y and z such that $x + y = z$. Sum-free sets have been studied extensively in additive combinatorics (Paul Erdős was particularly interested in these sets) but algorithmic questions relating to sum-free sets have thus far received very little attention. We consider the problem, given a set A, of determining whether A contains a sum-free subset of size at least k. We show that this problem is NP-complete in general and also hard to approximate, but is tractable with respect to certain parameterizations; in the cases where the decision problem is tractable, we also consider the complexity of counting all sum-free subsets of size exactly k.

This is joint work with Andrew Treglown.

11:20am **Ramsey properties of the Erdős–Renyi graph and random sets of integers**

Andrew Treglown (University of Birmingham)

In the mid-1990s, Rödl and Ruciński made a significant breakthrough in the study of Ramsey properties of graphs. Indeed, they determined the threshold for the (H, r)-Ramsey property in the Erdős–Renyi random graph. (Here, we say a graph G is (H, r)-Ramsey if whenever the edges of G are r-coloured, there is a monochromatic copy of H in G.) In this talk we revisit this result, giving a so-called resilience version of this Random Ramsey theorem. As well as strengthening the result of Rödl and Ruciński, our theorem also implies the random version of Turán's theorem due to Conlon and Gowers, and Schacht, and also resolves a conjecture of Kohayakawa and Kreuter in certain general cases.

We will also discuss analogous results concerning a random version of Rado's theorem. This is joint work with Robert Hancock and Katherine Staden.

1:30pm **The phase transition in Achlioptas processes**

Oliver Riordan (University Oxford)

The classical random graph process starts with a fixed set of n vertices and no edges. Edges are then added one-by-one, uniformly at random. One of the most interesting features of this process, established by Erdős and Rényi more than 50 years ago, is the phase transition near $n/2$ edges, where a single 'giant' component emerges from a sea of small components. This example serves as a

starting point for understanding phase transitions in a wide variety of other contexts. Around 2000, Dimitris Achlioptas suggested an innocent-sounding variant of the model: at each stage two edges are selected at random, but only one is added, the choice depending on (typically) the sizes of the components it would connect. This may seem like a small change, but these processes do not have the key independence property that underlies our understanding of the classical random graph process. One can ask many questions about Achlioptas processes; the most interesting concern the phase transition: does the critical value change from $n/2$? Is the nature of the transition the same or not?

I will describe a number of results on these questions from joint work with Lutz Warnke.

2:20pm **Graph classes under homomorphic image order**

Sophie Huczynska (University of St Andrews)

Combinatorial structures have been considered under various orders, including substructure order and homomorphism order. In this talk, I will introduce and discuss the homomorphic image order, corresponding to the existence of a surjective homomorphism between two structures. I will focus on partial well-order and antichains, exploring how the homomorphic image order behaves in the context of graphs and graph-like structures. In particular, I will discuss a near-complete characterization of partially well-ordered avoidance classes with one obstruction.

This is joint work with Nik Ruškuc.

3:40pm **Elimination of multiple intersections, and the topological Tverberg conjecture**

Uli Wagner (IST Austria)

We survey some classical results on embeddings of simplicial complexes in Euclidean spaces (higher-dimensional analogues of embeddings of graphs in the plane) and some recent generalizations (obtained in joint work with Mabillard) from embeddings (maps without double points) to maps without triple, quadruple, and higher-mutiplicity intersections. Furthermore, we discuss how these results, together with work of Özaydin and of Gromov, Blagojevic, Frick, and Ziegler, imply the existence of counterexamples to some long-standing conjectures in topological combinatorics, in particular the topological Tverberg conjecture.

4:30pm **Globally rigid braced triangulations**

Tibor Jordan (Eötvös Loránd University, Budapest)

Cauchy proved that if the vertex-edge graphs of two convex polyhdra are isomorphic and corresponding faces are congruent then the two polyhedra are the same. It follows that a convex polyhedron with triangular faces, as a bar-and-joint framework, is rigid. It is also well-known that the graph of such a polyhedron - a maximal planar graph - is rigid in three-space, provided it is realised in a sufficiently general position.

Global rigidity is stronger than rigidity: a framework is said to be globally rigid if the bar lengths determine all pairwise distances between the joints. The graphs of triangulated polyhedra are not globally rigid. We shall consider - the graphs of - braced triangulated polyhedra and characterise the bracing patterns which make them globally rigid in three-space.

This is joint work with Shin-ichi Tanigawa.

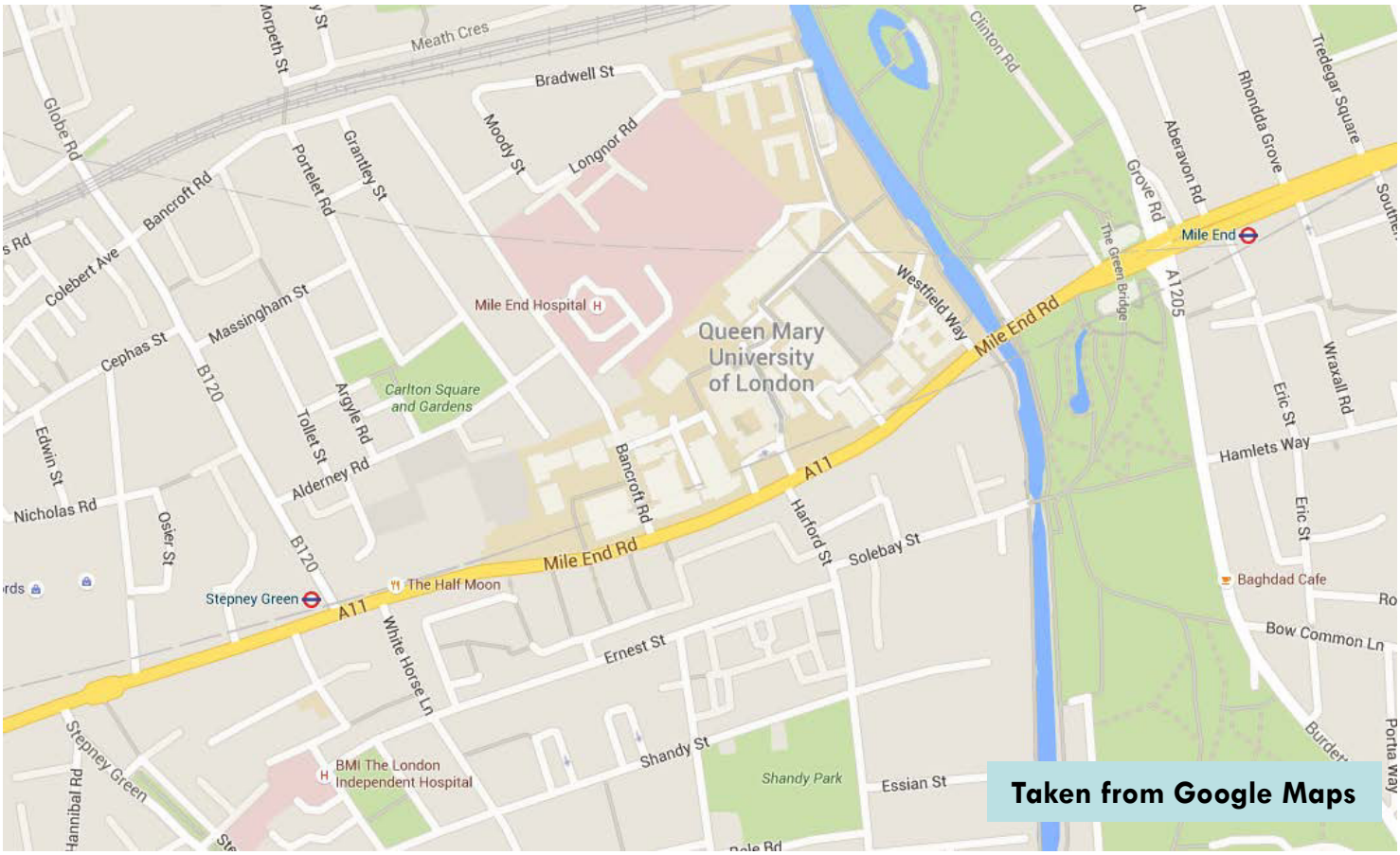
PLACES TO EAT: in and around QMUL

Close by:

90-degree Melt – Vegetarian, molten-cheese-based menu – 235 Mile End Rd
Costa – standard café – 556 Mile End Rd
Efes – Turkish: kebabs, etc. – 230 Mile End Rd
Greedy Cow – burgers, salads & steaks – 2 Grove Rd
Morgan Arms – gastropub, possibly too far for lunch – 43 Morgan St
Nandos – Portuguese-style chicken chain – 552 Mile End Rd
The Coffee Room – best coffee in the 'hood – 6A Grove Rd
The Half Moon – Wetherspoon's, standard pub food – 213–223 Mile End Rd
The Pizza Room – pizzas – 2A Grove Rd
Verdi's – upscale Italian (by Mile End standards) – 237 Mile End Rd

On campus:

Cafe Grad – Starbucks coffee and sandwiches – Graduate Centre
Drapers Bar & Kitchen – basic student union-run operation – Godward Square
Infusion – shop with take-away sandwiches, etc. – Godward Square
Mucci's – pasta & pizza – Library Square
SCR Bar – freshly made sandwiches, limited hot food – Queen's Building
*(Note that **Curve**, the on-campus cafeteria, is shut for May and June 2017)*



THURSDAY 11 MAY 2017

Schedule

The second day of the Colloquia in Combinatorics will be held at The London School of Economics and Political Science, starting at 10.30am. Everyone interested is welcome to attend any part of the event. The talks will be held in Sheikh Zayed Theatre, New Academic Building, LSE (please note this is a change to last year's venue – listed as NAB on the LSE map on page 12). Refreshment breaks will be taken Lower Ground Floor Atrium, New Academic Building, LSE; the reception will be held on the 8th Floor, New Academic Building, LSE.

Time	Speaker	Presentation title
10:00	**Coffee and arrival** *(Lower Ground Floor Atrium, New Academic Building)*	
10:30	Ewan Davies (LSE, UK)	Tight bounds of the coefficients of partition functions via stability
11:20	Asaf Shapira (Tel-Aviv)	Removal lemmas with polynomial bounds
12:10	**Lunch** *(own arrangements – options on campus and nearby)*	
13:30	Dömötör Pálvölgyi (Cambridge)	Coloring geometric hypergraphs
14:20	Shoham Letzter (Zürich)	Ramsey theory in directed graphs
15:10	**Afternoon tea break** *(Lower Ground Floor Atrium, New Academic Building)*	
15:40	Guillem Perarnau (Birmingham)	Critical percolation on random regular graphs
16:30	Ronitt Rubinfeld (MIT/Tel-Aviv)	**Biggs Lecture:** Local computation algorithms
17:30	**Reception** *(8th Floor, New Academic Building)*	

10:30am **Tight bounds of the coefficients of partition functions via stability**

Ewan Davies (LSE, UK)

Partition functions arise in statistical physics and probability theory as the normalising constant of Gibbs measures and in combinatorics as graph polynomials. The partition functions of the hard-core model and monomer-dimer model are the independence and matching polynomials respectively.

We show how stability results follow naturally from the recently developed occupancy method for maximising and minimising physical observables over classes of regular graphs, and then show these stability results can be used to obtain tight extremal bounds on the individual coefficients of the corresponding partition functions.

As applications, we prove new bounds on the number of independent sets and matchings of a given size in regular graphs. For large enough graphs and almost all sizes, the bounds are tight and confirm the Upper Matching Conjecture of Friedland, Krop, and Markström and a conjecture of Kahn on independent sets for a wide range of parameters.

11:20am **Removal lemmas with polynomial bounds**

Asaf Shapira (Tel Aviv University)

Addressing a problem of Alon and Fox, we prove new sufficient and necessary criteria, guaranteeing that a graph property admits a removal lemma with a polynomial bound. Although both are simple combinatorial criteria, they imply almost all prior positive and negative results of this type, as well as many new ones. In particular, we show that every semi-algebraic graph property admits a polynomially bounded removal lemma. This confirms a conjecture of Alon.

This is oint work with L. Gishboliner

1:30pm **Coloring geometric hypergraphs**

Dömötör Pálvölgyi (University of Cambridge)

A covering of the plane by a family of sets is called m-fold if every point is contained in at least m members of the family. Such a covering is called decomposable if the family can be partitioned into two subfamilies that each form a (1-fold) covering of the whole plane. Pach conjectured in 1980 that for every plane convex set D there is an m such that every m-fold covering of the plane with the translates of D is decomposable. I will give a short summary of related results (mainly when D is a polygon), then disprove the conjecture (when D is a disk) and propose a new conjecture, and mention several further open problems.

2:20pm **Ramsey theory in directed graphs**

Shoham Letzter (ETH Zurich)

The classical result, by Gallai, Hasse, Roy and Vitaver, which states that every orientation of a graph with chromatic number n contains a directed path on n vertices, can be used to prove that every 2-colouring of a tournament on n^2 vertices contains a monochromatic directed path on n vertices. We generalise this result, showing that for some constant c, every 2-colouring of a tournament on cn^2 edges contains monochromatic copies of every oriented tree on n vertices; this is tight up to a constant factor.

This is joint work with Matija Bucić and Benny Sudakov.

3:40pm **Critical percolation on random regular graphs**

Guillem Perarnau (University of Birmingham)

We show that for all $d \in \{3, \dots, n-1\}$ the size of the largest component of a random d-regular graph on n vertices at the percolation threshold $p = 1/(d-1)$ is $\Theta(n^{2/3})$, with high probability. This extends known results for fixed $d \geq 3$ and for $d = n - 1$, confirming a prediction of Nachmias and Peres on a question of Benjamini. In contrast to previous approaches, our proof is based on a simple application of the switching method.

This is joint work with Felix Joos.

'The Norman Biggs Lecture'

Local computation algorithms

Ronitt Rubinfeld (MIT and Tel Aviv University)

Consider a setting in which inputs to and outputs from a computational problem are so large, that there is not time to read them in their entirety. However, if one is only interested in small parts of the output at any given time, is it really necessary to solve the entire computational problem? Is it even necessary to view the whole input? We survey recent work in the model of *local computation algorithms* which for a given input, supports queries by a user to values of specified bits of a legal output. The goal is to design local computation algorithms in such a way that very little of the input needs to be seen in order to determine the value of any single bit of the output. In this talk, we describe results on a variety of problems for which sublinear time and space local computation algorithms have been developed – we will give special focus to finding maximal independent sets and sparse spanning graphs.

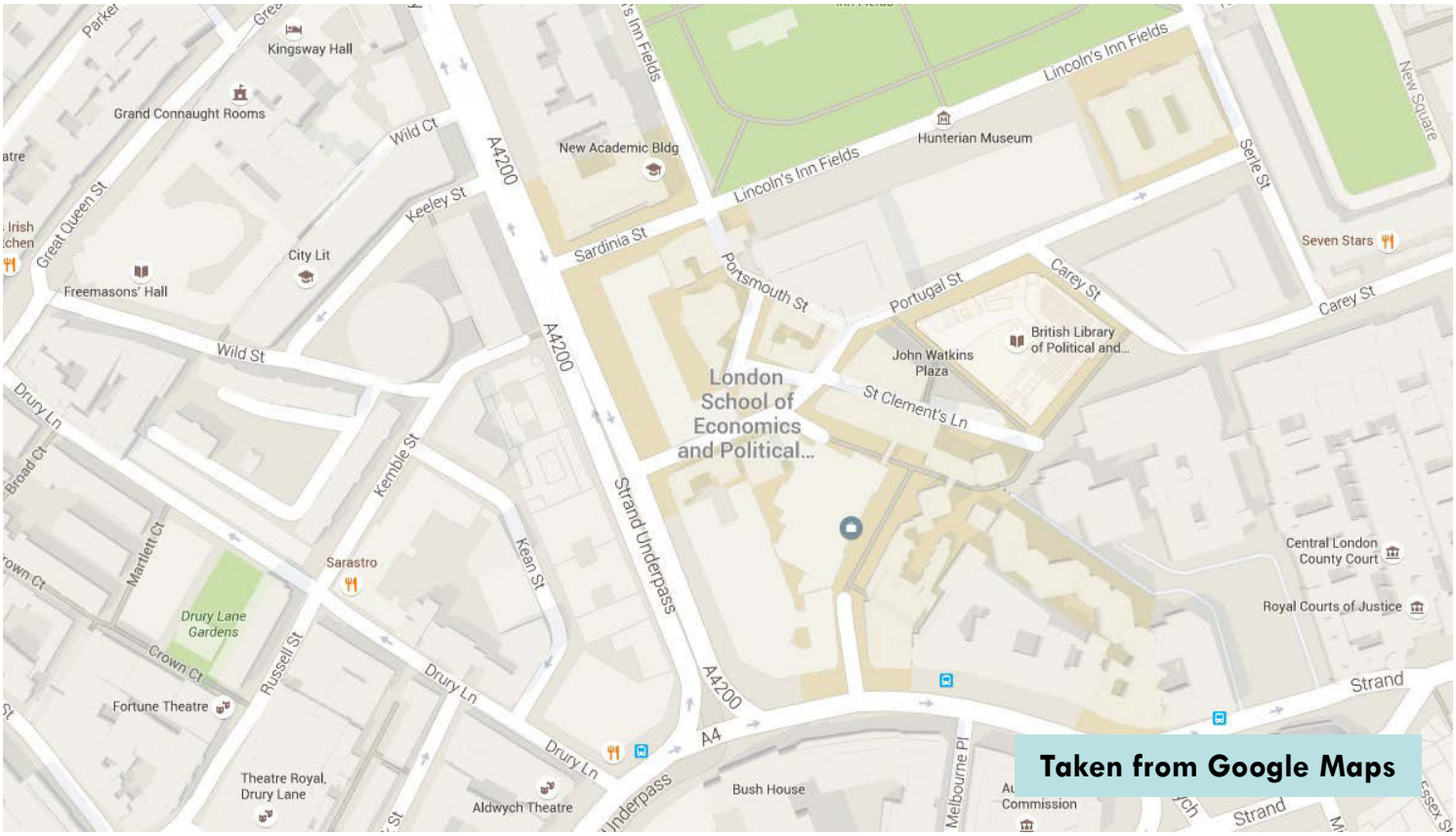
PLACES TO EAT: in and around LSE

Close by:

All Bar One – modern chain with full menu – 58 Kingsway
Belgo – Belgian beer & food – 67 Kingsway
Bill's – European chain with full menu – 42 Kingsway
Café Amici – Italian café – 7-9 Kingsway
Costa – standard café – 9-11 Kingsway
EAT – sandwich bar (chain) – 7-9 Kingsway
Paul – bakery & café – 36-38 Kingsway
Pret a Manger – standard café – 29 -33 Kingsway
Sainsburys – supermarket – 129-133 Kingsway
Shakespeare's Head – Wetherspoon's, standard pub food – 64-78 Kingsway
Starbucks – standard café – 10 Kingsway
Subway – fast food sandwich shop – 15 Kingsway
The Delaunay Counter – casual café-deli – 55 Aldwych
Viet Eat – Vietnamese – 48 Kingsway
Wasabi – Japanese chain serving bento boxes, sushi & hot food – 19 Kingsway

On campus:

The Bean Counter – café with hot & cold snacks – 32 Lincoln's Inn Fields
Café 54 – grab & go – New Academic Building
Fields Bar and Kitchen – perfect for a relaxed lunch – Lincoln's Inn Fields
Fourth Floor Café Bar – relaxing café with freshly made deli sandwiches – Old Building
Fourth Floor Restaurant – offers a wealth of eating options – Old Building
George IV Pub – perfect for a pub lunch – Portugal Street
LSE Garrick – cafe & restaurant – Columbia House
Mezzanine Café – pop up with different daily options – New Academic Building
Plaza Café – coffee and snacks – John Watkins Plaza



Get the discussion going: when tweeting about the Colloquia, please use the hashtag **#CC2017**

Follow us at:

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2017 Colloquia in Combinatorics

Speakers from CC2017

Supported by

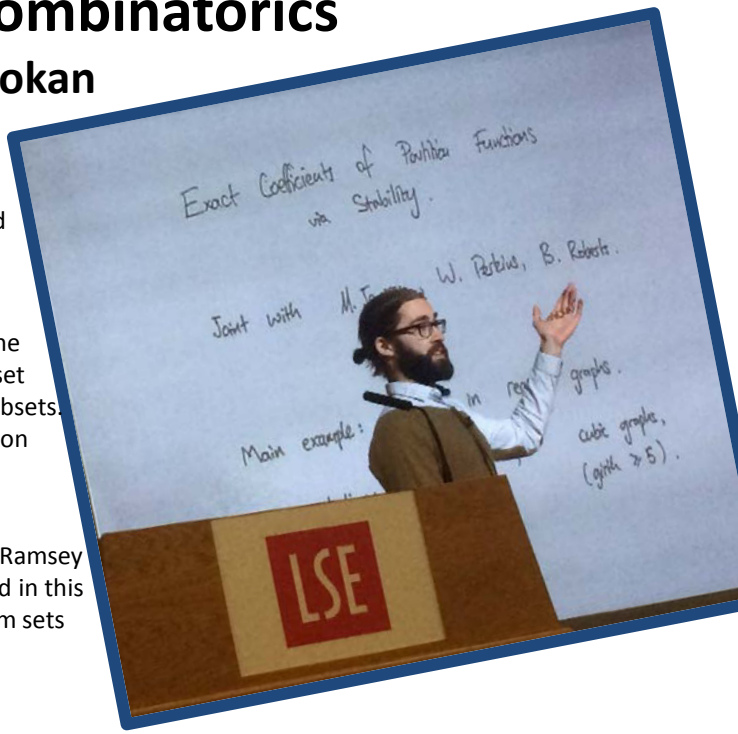
British Combinatorial Committee

LONDON MATHEMATICAL SOCIETY

Report on 2017 Colloquia in Combinatorics

by Julia Böttcher & Jozef Skokan

Support for this event by the London Mathematical Society and the British Combinatorial Committee is gratefully acknowledged by the organisers.



The 2017 Colloquia followed the successful format established in the past: six invited talks were delivered on each of the two days. Most participants attended both days.

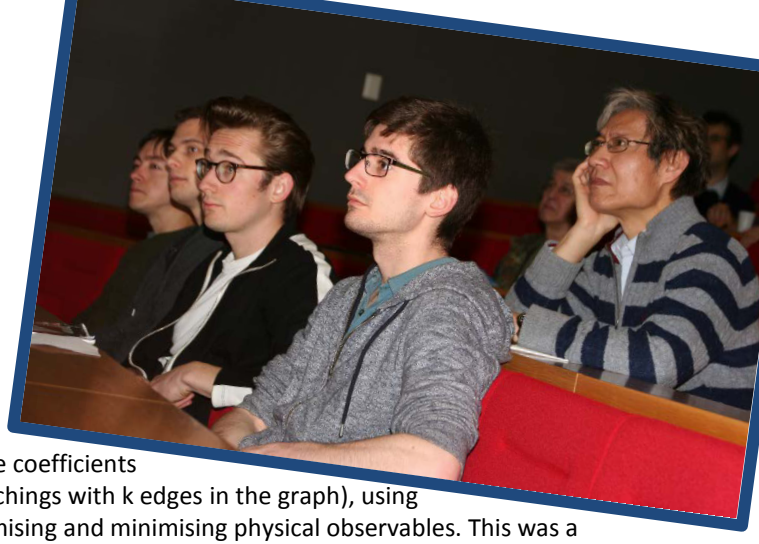
The Queen Mary day started with an engaging talk by Kitty Meeks. Her talk was about two widely-studied research areas, complexity theory and sum-free subsets, which have not been studied together before. She began with a theorem of Erdős, according to which any set of n natural numbers contains a sum-free subset of size at least n/3. Now one can ask whether there is a sum-free subset of size n/3+k, or to count such subsets. This kind of problem lends itself well to analysis via parameterised complexity. Kitty gave a nice introduction into this topic, with a number of results and many suggestions for further research.

Andrew Treglown discussed the resilience of Ramsey properties of the random graph and random sets of integers. The central question here is how many edges one can delete before losing the typical value of a Ramsey number in the random graph. Andrew demonstrated a new way to apply the celebrated container method in this setting and obtain improvements on classical results as well as some new ones about properties of random sets of integers.

Oliver Riordan's talk focused on random graph processes. The classical random graph process starts with a fixed set of n vertices and no edges. Edges are then added one-by-one, uniformly at random. One of the most interesting features of this process, established by Erdős and Rényi more than 50 years ago, is the phase transition near n/2 edges, where a single 'giant' component emerges from a sea of small components. Oliver was considering the Achlioptas process, a variant on Erdős–Rényi where, at each step, you choose two random edges, and keep one, the choice depending on the size of the components they connect. He discussed many interesting questions and results about phase transition in this modified process.

Afterwards, Sophie Huczynska talked about the "homomorphic image" order on relational structures such as graphs: in this order, G is smaller than H if there is a homomorphism from G to H mapping the edge set of G onto the edge set of H. She began by describing a variety of graph orders, such as subgraph order, induced subgraph order, and minor order, and showing how all can be expressed in terms of homomorphisms. Typical questions are whether a class of graphs or other structures is a partial well-order with respect to the homomorphic image order (that is, whether it contains no infinite antichains), and describing the antichains if possible.

The last two talks were both connected to geometry. Uli Wagner surveyed some classical results on embeddings of simplicial complexes in Euclidean spaces (higher-dimensional analogues of embeddings of graphs in the plane) and some recent generalisations from embeddings (maps without double points) to maps without triple, quadruple, and higher-multiplicity intersections. He then discussed how these results implied the existence of counterexamples to some long-standing conjectures in topological combinatorics, in particular the topological Tverberg conjecture.



The topic of the last talk, by Tibor Jordan, was rigid graphs. A graph is rigid if the framework formed by replacing the edges by rigid rods and the vertices by flexible hinges is rigid. A framework is said to be globally rigid if the bar lengths determine all pairwise distances between the joints. Global rigidity is a stronger concept than rigidity: the graphs of triangulated polyhedra are rigid (Cauchy knew this in 1813) but not globally rigid. In his talk Tibor discussed conditions under which triangulated polyhedra become globally rigid in three-dimensional space.

Ewan Davies opened the LSE day; he gave a fascinating talk on getting accurate values or estimates for the coefficients of the matching polynomial of a graph (the polynomial in which the coefficient of x^k is the number of matchings with k edges in the graph), using ideas from statistical mechanics. The key idea was to use a newly developed occupancy method for maximising and minimising physical observables. This was a very assured and confident talk which raised lots of questions from the audience.

Asaf Shapira's talk was about removal lemmas, a concept widely applied in discrete mathematics and theoretical computer science. When removal lemmas are used in property testing they often lead to inefficient tower-type estimates on the size of testing sample. Asaf lectured on new necessary and sufficient conditions for the existence of efficient removal lemmas which produce polynomial-type estimates.

Dömötör Pálvölgyi lectured on colouring geometric hypergraphs. He surveyed many different geometric colouring problems in d-dimensional space. He demonstrated by examples how complicated these questions are even in low dimensions and left us with many open questions.

Shoham Letzter discussed Ramsey properties of tournaments. In Ramsey theory we study when a coloured complete graph (or any other discrete structure) must contain a monochromatic copy of a given graph (substructure). This is a widely studied area that has attracted a lot of attention since the 1940's. Shoham talked about Ramsey theory for tournaments – complete graphs in which each edge has an orientation. Orientation represents another layer of complexity and hence one would expect a different behaviour comparing to Ramsey properties of graphs. Shoham presented results and insights that confirm this intuition.

The talk by Guillem Perarnau was also about random graph processes in which he was looking through the critical window in the percolation problem for regular graphs. In particular, Guillem considered percolation on random d-regular graph in which every edge is preserved with probability p and he studied the size of the largest component at the percolation threshold $p = 1/(d-1)$.

The meeting ended with Biggs Lecture delivered by Ronitt Rubinfeld. Ronitt discussed computation problems in which inputs and outputs are so large that there is not time to read them in their entirety. She focused on the case when one is only interested in small parts of the output at any given time and the goal is to design (local) algorithms in such a way that very little of the input needs to be seen in order to determine the value of any single bit of the output. This was a very lively talk describing results on a variety of problems for which sublinear time and space local computation algorithms have been developed.


Tibor Jordan


Uli Wagner


Andrew Treglown


Kitty Meeks


Sophie Huczynska


Oliver Riordan

Queen Mary University of London – Day 1, 2017


Ewan Davies


Dömötör Pálvölgyi


Shoham Letzter


Ronitt Rubinfeld


Asaf Shapira


Guillem Perarnau

The London School of Economics and Political Science – Day 2, 2017