

# School of Mathematics and Statistics

## Newsletter

July 2017

### *Congratulations...*

- to Peter Cameron on being awarded the 2017 Senior Whitehead Prize of the London Mathematical Society. The prize is awarded for ‘exceptional research contributions across combinatorics and group theory, his fertile imagination and encouragement of others having sparked activity in many fields’.
- to Duncan Mackay and Len Thomas on their promotions to Professorships.
- to Ben Erichson for his successful defence of his PhD thesis ‘Randomness as a Computational Strategy: On Matrix and Tensor Decompositions’ (i.e. useful computational developments in dealing with large-data with video/image-processing as a particular application). He has now taken up a postdoc in applied mathematics at the University of Washington in Seattle, with Nathan Kutz and Steve Brunton.
- to Tom Bourne who successfully defended his PhD thesis entitled ‘Counting Subwords and Other Results Related to the Generalised Star-Height Problem for Regular Languages’.
- to Linnéa Franßen on winning the Holy Rood Mathematics Hall of Fame Competition 2017 – see below under Public Engagement.
- to Jon Fraser on his engagement to Rayna Rogowsky. They will be having a very small family wedding (in Jon’s conservatory!) on 29th July. Jon and Rayna first met as undergraduates in St Andrews in 2005.

### *Visitors*

- Nik Ruskuc is hosting Peter Mayr from the University of Colorado at Boulder 10-17th July; they are continuing their joint work on generators and relations of direct products in algebra.

### *Public Engagement*

- On 15th June Antonia Wilmot-Smith ran an afternoon of maths workshops for S3 pupils as part of the *First Chances Project*. This access programme works with selected pupils from Fife schools, and is now being expanded to run from P7 upwards.
- The Curriculum for Excellence for Scottish schools includes a requirement to look at historical figures in mathematics. This has usually led to S1/S2 pupils creating stale posters of Pythagoras, Euclid, etc. This year Holy Rood High School Edinburgh decided to consider instead live Mathematicians working in Scottish Universities. Mathematicians from six Scottish universities were asked to explain their research to the students in a format of their choice. Each group of students focused on one of the Universities to identify the Mathematician who inspired them most. Linnéa Franßen was selected from St Andrews. The pupils presented the work of each of the final six nominated Mathematicians to their year group. After the presentations, a vote involving over 200 pupils voted for Linnéa to become the 2017 Holy Rood Mathematics Hall of Fame inductee. In September she will visit Holy Rood High School to collect her prize, to present her research to the S2 pupils and to discuss how mathematical research works in general. She will also be speaking to S5/6 students who are interested in studying mathematics.

- Kenneth Falconer gave an illustrated talk ‘Fractals – Simple or Complex?’ at a well-attended day school *Picturing Mathematics* on 24th June run by the University of Oxford Department for Continuing Education.

## Visits and Conferences

- Linnéa Franßen, Douglas Howroyd, Nayab Khalid, Fiona Macfarlane, Chris Russell, Michael Torpey and Wilf Wilson attended the *Edinburgh Mathematical Society Postgraduate Meeting* at the Burn from 7-9th June. All gave talks, met up with other math postgrads in Scotland, and live-streamed the election results on Thursday night.



- Tim Bailey, Nayab Khalid and Adán Mordcovich attended the *Postgraduate Group Theory Conference 2017* at the University of Cambridge from 27th June-1st July. Nayab gave a talk entitled ‘Rearrangement Groups of Connected Spaces’ and won the bid to host PGTC 2018, which will be the 20th iteration of the conference, at St Andrews.
- On 26-30th June Martyn Quick attended the workshop *Applications of Operator Algebras: Order, Disorder and Symmetry* at the ICMS in Edinburgh, with the ‘symmetry’ part most relevant to his interests.
- Rosemary Bailey, Peter Cameron, Sophie Huczynska and Nik Ruskuc attended the *British Combinatorial Conference* in Glasgow from 3rd-7th July. Rosemary was a plenary speaker, and talked on ‘Relations among partitions’, and Peter and Sophie gave contributed talks. Peter was re-elected chair of the British Combinatorial Committee at the Conference business meeting.
- In the last week of June, Peter Cameron gave a short course of lectures on ‘Eigenvalues and root systems in finite geometry’ at a summer school in *Finite Geometry* at the University of Sussex. The previous week, he spoke on ‘Sum-free sets’ at a conference on *Topological Dynamics, Functional Equations, Infinite Combinatorics and Probability* at the London School of Economics.
- Nik Ruskuc was an invited speaker at the joint *94th Arbeitstagung Allgemeine Algebra and 5th Novi Sad Algebraic Conference* in Novi Sad, Serbia, 15-18th June. The conference marked the retirement of Professor Sinisa Crvenkovic, who was Nik’s first academic supervisor and co-author.
- While on holiday in Pakistan, Nayab Khalid gave an invited talk entitled ‘Rearrangement Groups of Connected Spaces’ at her alma mater, CIIT Islamabad.
- Kenneth Falconer, Jon Fraser and Doug Howroyd attended the *Workshop on Diophantine Approximation and Related Fields* at the University of York from 26-30th June, where Kenneth and Jon gave invited lectures.
- Jon Fraser and Doug Howroyd attended a conference on *Thermodynamic Formalism – Applications to Geometry and Number Theory* from 10-12th July at the University of Bremen. Jon gave a talk on ‘Dimensions of equilibrium measures on some self-affine sets’. The meeting was in memory of Bernd Stratmann (1957-2015) who was a lecturer in St Andrews from 1996-2010 before moving to Bremen.
- Kenneth Falconer gave a keynote lecture on ‘Fractal Projections – Old and New’ at the conference on *Analysis, Probability and Mathematical Physics on Fractals* at Cornell University from 13th-17th June.

- The biennial summer meeting of the *National Centre for Statistical Ecology* took place at the University of Kent at Canterbury from 26-29th June. Rosemary Bailey, David Borchers, Steve Buckland, Richard Glennie, Cornelia Oedekoven and Len Thomas all participated. Two days of research talks were followed by a one-day workshop on Spatial Point Process Modelling with INLAbru (software developed on the EPSRC grant), taught by David together with Finn Lindgren (Edinburgh). The main talking point was a massive cardboard hare outside the venue which started to disintegrate after very heavy rain ...



- Mike Todd spent a month at the Erwin Schrödinger Institute in Vienna on an *ESI Research in Teams* project with Henk Bruin and Dalia Terhesiu. During the visit he gave a talk on ‘Analysis of a transient interval map’ in the *BudWiSer* (joint Vienna-Budapest ergodic theory groups) meeting in Budapest - for some reason, Hungarian champagne was handed out just prior to his seminar.
- David Borchers and Janine Illian gave plenary talks at the 2017 *EURING* (*European Union for Bird Ringing*) *Analytic Meeting and Workshop* in Barcelona, one of the premier international conferences in statistical ecology. Both talks related to the research conducted by David and Janine, jointly with Finn Lindgren from the University of Edinburgh, as part of an EPSRC grant that finished in March this year.
- Steve Buckland attended an international workshop in Solsona, Spain, in June, to consider fire management strategies in dry regions to maximise biodiversity. A large contingent from Melbourne included Mick McCarthy, who is well-known at CREEM following his research visit a few years ago. During the workshop, they had record high temperatures for June, and the wildfire season was well under way by the end of the workshop.
- Peter Jupp attended the workshop *Advances in Directional Statistics 2017* in Rome on 8-9th June, at which he spoke on ‘Probability integral transforms in directional statistics’. The workshop dinner was held on the 6th floor of a hotel near the Vatican and is memorable for the power cut which encouraged diners to work up an appetite by climbing the stairs. Peter also visited the departments of statistics in the Universities of Padua (1222) and Bologna (1088), where he discussed research with like-minded colleagues, gave seminars and confessed to being from a new university.
- Janine Illian was a committee member at the defence of Henrike Häbel’s PhD thesis at University of Gothenburg, Sweden on 9th June. The thesis ‘From experiments with images to 3D models’ developed spatial point process methodology to assess properties of 3D sustainable materials relevant to drug development.
- Thomas Neukirch attended the *European Physical Society’s 44th Conference on Plasma Physics* in Belfast from 26-30th June and gave an invited talk on ‘Collisionless current sheets: Equilibria and (some) dynamics’. Alan Cairns also attended and presented a poster.
- Alan Cairns attended a meeting at the Rutherford Appleton Laboratory on 20th June celebrating the 40th anniversary of establishing the Central Laser Facility. The next week he attended the *European Physical Society Conference on Plasma Physics* in Belfast and was an author on two posters.
- Isobel Falconer attended the *British Society for the History of Science Annual Conference* in York on 7-8th July where she gave a presentation on James Clerk Maxwell and Null Methods.
- Several members of the School have travelled recently to undertake duties as external examiners. These include Martyn Quick in Oxford on 6-7th July as their external for second year Pure Mathematics (‘Part A’ in Oxford nomenclature), and Kenneth Falconer in Milton Keynes on 11th July for the Open University MSc.

- Members of the Solar Group have been busy at a variety of conferences during the last few weeks. Vasilis Archintis and Petros Syntelis attended the *Flux Emergence Workshop* in Budapest from 27-30th June.

Patrick Antolin, Ineke De Moortel, Alan Hood, Tom Howsen, Craig Johnston and Paolo Pagano attended the *LOOPS 8 Workshop* in Palermo from 27-30th June. Patrick was a member of the organising committee and Ineke and Alan both gave invited talks. One of the science topics involved the mechanisms for heating the solar corona. With outside temperatures exceeding 35 degrees, we could have done with some solar cooling instead

The National Astronomy Meeting was held at Hull University from 3rd-6th July. A large contingent from the solar group, Alexei Borissov, Tom Elsdon, Alan Hood, Tom Howson, Craig Johnston, James Therlfall, Henrik-Jan Van Damme, Stephanie Yardley, attended and gave talks. By far and away the highlight was the Solar Group winning the 6-a-side football tournament for the second year running, with victories over teams such as Edinburgh, Liverpool John Moores and ‘Dipole United’!



## Grants

- David Borchers was awarded a small Impact and Knowledge Exchange fund grant of £5,424 for a project entitled ‘Surveying the Small Apes: Developing tools and techniques for conserving gibbons and siamang’, to part-fund a meeting of gibbon ecologists and statisticians in St Andrews in August to try to resolve discrepancies between gibbon density estimates obtained using traditional methods and methods developed at St Andrews.
- Magda Carr has been awarded £3k from the Marine Alliance for Science and Technology for Scotland (MASTS) small grants round. This will go towards material costs associated with her Hydralab+ grant to study internal waves in the marginal ice zone in an ice laboratory in Hamburg Ship Model Basin, HSV A.

## Other News

- Peter Cameron’s new book *Notes on Counting - An Introduction to Enumerative Combinatorics* was published by Cambridge University Press on 29th June. The publishers only managed to have one copy at the British Combinatorial Conference meeting and this was given away in a prize draw to a conference participant.
- A *St Andrews History of Maths YouTube* channel is under construction: [https://www.youtube.com/channel/UCfe5L6EX94tiNvQpkdc2N\\_w](https://www.youtube.com/channel/UCfe5L6EX94tiNvQpkdc2N_w) It is starting with videos of some of the presentations from last year’s Mathematical Biography conference, and we hope to release videos of our future History of Maths.
- Oliver Allanson has joined the Space and Atmospheric Electricity Group at the University of Reading as a postdoc in Space Plasma Physics, working with Dr Clare Watt. Their work is as part of a consortium funded by the NERC ‘Rad-Sat’ project: Modelling the acceleration, transport and loss of radiation belt electrons to protect satellites from space weather (2017-2021). The consortium includes the British Antarctic Survey, Imperial College, UCL/MSSL, Sheffield and Reading. Clare and Oliver will focus on the theory of wave-particle interactions in the Earth’s Radiation Belts.

## ***Future Events***

- The 26th meeting of the *North British Semigroups and Applications Network (NBSAN)* will take place in St Andrews on 13th July from 1:30pm. Speakers include Nick Gilbert, Zur Izhakian, Munazza Naz, Matt McDevitt, and Mark Kambites. More details can be found at <http://www.maths.manchester.ac.uk/~mkambites/nbsan.php>
- *Groups St Andrews 2017* in Birmingham will take place from 5-13th August. This is the tenth in the series of Groups St Andrews Conferences which have been held every four years from 1981. The main speakers are Michael Aschbacher (Caltech), Pierre-Emmanuel Caprace (Université Catholique de Louvain), Radha Kessar (City, University of London) and Gunter Malle (TU Kaiserslautern). One hour speakers are Tim Burness (Bristol), Vincent Guirardel (Université de Rennes 1), Harald Helfgott (Göttingen), Andrei Jaikin-Zapirain (Universidad Autónoma de Madrid) and Donna Testerman (École Polytechnique Fédérale de Lausanne). The organisers are Colin Campbell, Martyn Quick, Edmund Robertson and Colva Roney-Dougal together with Chris Parker from Birmingham.

## ***Caption Competition***

- Captions received for this picture of the board in the common room included:
  - ‘The University’s Strategic Plan explained in a simple cartoon’ HF
  - ‘I always tell students that drawing a diagram is a great help when doing mathematics’ KJF
  - ‘The new parliament trying to make plans’ MMcD



## ***Next Issue***

- The next edition of the School Newsletter will be circulated in August. Items for inclusion may be sent to [schoolnews@mcs.st-andrews.ac.uk](mailto:schoolnews@mcs.st-andrews.ac.uk) at any time but a reminder will be sent out a week before the deadline.