

# School of Mathematics and Statistics Newsletter

March 2017

## *Congratulations*

- to Charlotte Jones-Todd who successfully defended her PhD thesis ‘Modelling Complex Dependencies Inherent in Spatial and Spatio-Temporal Point Pattern Data’.
- to Jon Fraser who has been awarded a place on the prestigious Scottish Crucible programme. This is a leadership and development programme organized by the Royal Society of Edinburgh for Scotland’s research leaders of the future involving three two-day residential ‘Labs’.
- to Stephanie van Willigenburg, now at the University of British Columbia, who has been awarded the 2017 Krieger-Nelson Prize of the Canadian Mathematical Society for outstanding research by a female mathematician. Stephanie completed her PhD in St Andrews in 1997, supervised by Edmund Robertson and Mike Atkinson. Her research is algebraic combinatorics and her recent work has focused on Schur functions, skew Schur functions and quasisymmetric Schur functions.

## *Welcome*

- Welcome to new PhD student Rick Camp, who will be developing spatio-temporal population models and applying them to Hawaiian forest birds, supervised by Len Thomas and Steve Buckland. Rick is starting his studies remotely from Hawaii; he and his family will be relocating to the possibly equally exotic St Andrews this summer.

## *Public Engagement*

- Jon Fraser visited Larbert High School on 16th March and spoke to their higher maths pupils about maths beyond the curriculum and fractals, and he conducted some problem solving sessions.
- Several members of the Solar and Magnetospheric Theory Group ran a stall at the annual Science Discovery Day in the Physics building on 4th March. The group, comprising of Alexei Borissov, Tom Elsdén, Clare Parnell, Paolo Pagano, Petros Syntelis, James Threlfall, Mats Wallberg and Antonia Wilmot-Smith, introduced and discussed a range of topics related to magnetism and solar behaviour to children and parents, with a display including interactive iron filing experiments, pictures and movies, not to mention creativity! They also gave a series of 30min talks throughout the day to showcase solar magnetism in action.



## *Visitors*

- Tomas Nilson from the University of Mid-Sweden visited for three weeks in February and March. He gave a talk on Agrawal's conjecture, and worked with Rosemary Bailey and Peter Cameron on a new class of arrays known as sesqui-arrays which have combinatorial and statistical significance.
- Robert Bailey of the Memorial University of Newfoundland made a brief visit, even briefer than planned because of Storm Doris. He spoke on metric dimension of distance-regular graphs, and discussed with members of CIRCA a database of distance-regular graphs that he is developing.
- Madeleine Whybrow, a PhD student from Imperial College London, visited Markus Pfeiffer funded by CoDiMa to work on GAP code supporting her project on Majorana Algebras and the Monster sporadic simple group. She gave a talk on her work at the Pure Mathematics Colloquium.

## *Conferences and Visits*

- Mike Todd visited the University of Porto to discuss new projects with Ana Cristina Freitas and Jorge Freitas.
- Jon Fraser gave a seminar at the University of Glasgow on 21st March entitled '(Almost) arithmetic progressions and dimension' on joint work with Han Yu.
- Peter Cameron visited the University of Vienna from 20-24th March, where he gave a course of ten lectures to the PhD students on permutation groups and transformation semigroups. He also gave two colloquia, one on the random graph and one on the 'ADE affair' (this refers, loosely, to mathematical classification problems where the answer is 'two infinite families and three isolated examples'), as well as a combinatorics seminar on combining cycle index and Tutte polynomial.
- David Dritschel was invited to the Simons Center for Geometry and Physics at Stony Brook, New York, where he presented work on a new class of steady solutions of the two-dimensional fluid equations at the workshop *Fluid flows: from graphene to planet atmospheres*, on 20-24th March.
- Andy Wright gave a seminar to the Maths Department at the University of Dundee on 13th March. The subject was resonant coupling of magnetohydrodynamic waves in three dimensions.
- Duncan Mackay gave the Physics Department colloquium at the University of Warwick on 15th March, a talk entitled 'The Sun's Global Magnetic Field'.
- Edmund Robertson gave the lecture 'Colin Maclaurin - mathematician, physicist and defender of Edinburgh' at the Fourteenth Edinburgh Lunchtime Rendezvous at the Clubhouse, Daniel Stewart's and Melville College, Edinburgh, on 22nd March. The lecture was followed by a most excellent lunch in the Clubhouse.
- At the beginning of March, Loren Johnson, a final year MMath student, and Isobel Falconer co-presented their work on 'Late 19th century female mathematicians at St Andrews', in a seminar at the Strathmartine Centre for Scottish History.
- Rosemary Bailey attended a one-day workshop on 17th March on *Design of experiments for experimentalists - A practical approach* organized by chemical engineers at University College London for the benefit of UCL PhD students and postdocs. As part of this, she gave a talk 'Introduction to factorial experiments'. Rosemary also visited statisticians at the Medizinischen Universität Wien in Vienna from 20-24th March. While there, she gave a talk on 'Hasse diagrams as an aid to understanding a family of models in experiments on biodiversity' to the Vienna section of the Austro-Swiss Region of the International Biometric Society.
- Michael Papatomas visited collaborators at Brunel University, London, and at the MRC in Cambridge, from 19-24th March. He gave a seminar at the Department of Mathematics, Brunel University, on Wednesday 22nd March entitled 'Exploring dependence between categorical variables: Benefits and limitations of using variable selection within Bayesian clustering in relation to searching for interactions'.

- David Borchers, Monique MacKenzie and Len Thomas contributed to the University's EPSRC IAA Showcase and Exhibition, held at the Gateway on 16th March. They showcased work conducted in collaboration with researchers in Namibia to monitor rhino poaching using GPS tags attached to vultures and hyenas, collaboration with the Global Snow Leopard and Ecosystem Protection Program in Mongolia to draw inferences about snow leopard distribution, abundance and behaviour from camera trap data, and work in Tanzania training researchers in wildlife sampling methods. See <https://epsrc-showcase.wp.st-andrews.ac.uk/2016/12/01/wildlife-conservation/>.

- David Borchers, Janine Illian and Steve Buckland, along with Finn Lindgren and Fabian Bachl from Edinburgh, held a professional training workshop on *Spatial Point Process Models for Ecological Survey Data* at CREEM, 20th-23rd March. This was to disseminate the methods and software developed under an EPSRC grant jointly held by the presenters. It attracted 38 participants from nine countries. See <https://sites.google.com/r-inla.org/inlabru/home>



*Tagging a vulture in Namibia*

- Monique Mackenzie and Cornelia Oedekoven gave guest lectures at the University of Namibia and the Namibian University of Science and Technology and attended meetings to plan collaborative work for the Summer. Chrissy Fell, one of our PhD students, is developing methods to enable automated detection of animals from high resolution images and undertake spatial modelling on a huge spatial scale and this meeting also served to update the academics involved in the project about progress.
- Monique Mackenzie and Lindsay Scott-Hayward presented a bespoke workshop to Natural England (NE) designed to help government agency staff and related specialist teams to assess the validity of analyses contained in reports supplied to NE. As part of this workshop, Monique and Lindsay critiqued case studies supplied by NE.
- Alexander Konovalov and Markus Pfeiffer went to Cernay, France to attend Sage-Days-85 <https://wiki.sagemath.org/days85> and worked on GAP and better integration between the GAP and Sage communities.
- Jointly with CAPOD and the Research Computing Team of St Andrews University Library, Alexander Konovalov organised a Software Carpentry workshop on March 23-24th, see <https://alex-konovalov.github.io/2017-03-23-standrews/> Alexander taught lessons on UNIX shell and version control with Git, with Michael Torpey as a helper. The course included an introduction to Python and working with Jupyter notebooks, taught by Leighton Pritchard from Dundee. The next workshop is planned for May, with registration open soon on PDMS. It is also recommended if you are interested in using version control for LaTeX documents and collaborating with co-authors via GitHub.

## ***Future Events***

- *GAP Days* will be held in May <http://gapdays.de/gapdays2017-spring/> on matrix objects in GAP, and in September <http://gapdays.de/gapdays2017-fall/> with an open workshop on any research related to GAP. Some funding is available for attendees.
- The *33rd British Colloquium for Theoretical Computer Science* will take place in St Andrews 26-28th April. It will feature Professor Laszlo Babai as LMS Keynote Speaker in Discrete Mathematics (5pm on 26th April, Lecture Theatre D). There will be an additional seminar on his work on 28th April. See <https://bctcs2017.cs.st-andrews.ac.uk/>

## ***Caption Competition***

- Caption suggestions sent in for last month's picture mainly referred to the new School building!

‘Professor Parnell thought the new Maths building was really cool, if a little cramped.’ LT

‘The new mathematics building has been completed under budget and ahead of schedule.’ JH

‘Hmmm, I must have a sign error in my coronal heating model!’ AWH



## ***Next Issue***

- The next edition of the School Newsletter will be circulated in late-April. 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.