

School of Mathematics and Statistics Newsletter

August 2017

Congratulations...

- to Monique MacKenzie on her appointment as Deputy Director of the University's Graduate School. Monique will start her new job, initially for period of three years, on 1st September and we wish her all the best for her new role!
- ... and to Antonia Wilmot-Smith who will be our School's new Director of Teaching when Monique steps down as Director of Teaching at the end of August!
- to Serveh Sharifi Far who passed her PhD viva on 2nd August for her thesis 'Parameter Redundancy in Log-linear Models'. Serveh will be starting work in September as a Teaching Fellow in the School of Mathematics at the University of Edinburgh.
- to Jon Fraser on his marriage to Rayna Rogowsky at a very small family wedding in their conservatory on Saturday 29th July. This did not prevent Jon being back at his desk in the Mathematical Institute the following Monday! Jon and Rayna first met as undergraduates in St Andrews in 2005.
- to Gemma Prescott who won the bronze medal for the club throw at the World Para Athletics Championships in London in July, to add to her bronze medals from the 2012 and 2016 Olympics. Longer-serving members of the School will remember Gemma who graduated in Mathematics in 2006.



Jon and Rayna

Welcome

- to Zarqa Zahid, a PhD student at the University of Peshawar in Pakistan, who is visiting the School for six months funded by the Pakistan Higher Education Commission to do some collaborative work with Clare Parnell on magnetic reconnection.
- to Rick Camp, PhD student supervised by Len Thomas and Steve Buckland. Although Rick started his studies in February, his first few months were completed remotely from his home in Volcano, Hawaii, while he wrapped up his work with the US Geological Survey. Rick will be working on spatial and temporal trend estimation from a multi-decade Hawaiian forest bird survey that he has been involved in running.

- to Theoni Photopoulou, former MSc student at St Andrews and now at the University of Cape Town, who is visiting CREEM for 7 weeks in August and September.
- to Ben Stevenson, former PhD student and postdoc at St Andrews, who is visiting CREEM for 3 weeks in August.
- to Shannon Rankin, from Southwest Fisheries Science Center, NOAA, San Diego who is visiting CREEM in August and September.

Public Engagement

- Jon Fraser presented a workshop on ‘Fractal Geometry and Dimension Theory’ at the *LMS Summer School* in Manchester 25-27th July. The aim of this annual summer school is to introduce modern mathematics to the best UK undergraduates who are not yet in their final year.

Meetings Organised

- An *Intermediate-level Distance Sampling Training Workshop* took place at the Observatory from 30th July-4th August. Len Thomas, Dave Miller and Laura Marshall were instructors and there were 24 participants, six of whom attended via video conference from Australia, Brazil and England. The others were from the UK, Cambodia, Brazil, Australia, Portugal, Namibia, China USA, Poland and Germany, see <https://twitter.com/DistanceSamp/status/895237302619865088>
- CREEM hosted two further training workshops from 7-11th August. The first was on *Analysis Methods for Animal-borne Tags*, taught by Tiago Marques and Sea Mammal Research Unit member Mark Johnson (who develops tags) and former CREEM member Stacy DeRuiter, with 29 participants. The second was on *Hidden Markov Models for Analysis of Time Series Data*, taught by former colleague Roland Langrock, now at Bielefeld University, together with two Bielefeld MSc students Timo Adam and Jennifer Pohle, Theo Michelot (PhD student at Sheffield who did an internship at CREEM a few years back) and Stacy DeRuiter. There were 24 participants.
- CREEM also hosted a workshop from 7-10th August to develop best practice guidelines for gibbon surveys. Of the 20 gibbon species, all but one is classified as Endangered or Critically Endangered in the IUCN Red List. Funded by the IUCN and the University’s Impact and KE fund, the workshop involves collaboration between gibbon biologists, ecologists and statisticians. Methods developed at CREEM are proving central to better assessment of gibbon abundance and distribution.



Participants at the animal-borne tags workshop outside the Observatory building

Visits and Conferences

- Peter Cameron's 70th birthday was marked (belatedly!) by a four-day meeting *All kinds of Mathematics Remind Me of You*, followed by a one-day workshop, variously called *Symmetry in Finite Models* or *Symmetry in Finite and Infinite Structures*. The meetings took place at the University of Lisbon and the whole thing was organized by mathematicians from Universidade Aberta and the Universities of Aveiro, Coimbra and Lisbon, enthusiastically led by João Araújo.
Of course, Peter had to attend all the talks in the first four days and rush between sessions during the workshop. His own talk, entitled 'Perchance to dream ...' mentioned several outstanding problems that he would like someone to solve.
Participants ranged in academic age from Peter's own DPhil supervisor Peter Neumann to recent St Andrews undergraduate Scott Harper. They included more than twenty co-authors including three with nine or more joint publications with him. The other participants from St Andrews were Rosemary Bailey (who spoke on 'Circular designs with weak neighbour balance'), Collin Bleak, Julius Jonusas ('Universal words and sequences'), James Mitchell ('Semigroups from digraphs'), Shayo Olukoya ('Growth rates of automata groups generated by reset automaton') and Wilf Wilson ('Maximal subsemigroups of monoids of partial order-(anti)endomorphisms').
- Jon Fraser is currently visiting De-Jun Feng at the Chinese University of Hong Kong from 8-17th August for joint research work.
- Mike Todd attended the conference *Current Trends in Dynamical Systems and the Mathematical Legacy of Rufus Bowen* in Vancouver. This was a huge conference which celebrated one of the most influential mathematicians in Ergodic Theory and Dynamical Systems and brought out many of the directions that his work has led to since his death in 1978, aged 31.
- David Dritschel visited the City University of New York at Staten Island to work with Andrew Poje on an Office of Naval Research proposal to model surface tracer distributions in the oceans. The transport of tracers has been observed to be remarkably complex, rapidly forming thin filaments and often collecting in small regions. This is believed to be a result of surface compressibility. Dritschel and Poje have developed a hierarchy of simple mathematical models to help understand this.
- Tom Elsdén attended the *Geospace Environment Modeling (GEM) 2017 Summer Workshop* in Portsmouth, Virginia from 18th-23rd June, where he gave a talk entitled 'The Theoretical Foundation of 3D Alfvén Resonances'.
- Andy Lynch gave a talk on estimating telomere lengths from whole genome sequencing data at the 53rd Meeting of *NextGenBUGS (The Next Generation Bioinformatics User Group)* in St. Andrews on 8th August.
- In July, Monique Mackenzie and Lindsay Scott-Hayward worked alongside colleagues at the Namibian University of Science and Technology (NUST), Ministry of Environment and Tourism, University of Namibia and the Etosha Ecological Institute on to several projects: 1) Image processing using high resolution images obtained using drones, 2) Quantifying the costs of fences for African wildlife in the face of a warming climate, 3) A confidential project involving high-value charismatic megafauna and critically endangered species. As a result of this visit, a funding application will be filed with the Illegal Wildlife Trade Challenge Fund which hopefully will contribute to an REF impact case study.
- Rosemary Bailey spent 17th-21st July visiting her collaborators Celia Nunes, Dario Ferreira and Sandra Ferreira at the Universidade da Beira Interior in Covilhã, Portugal. They continued their joint research on designs for experiments whose experimental units are unordered pairs. She also gave a seminar on 'Hasse diagrams as a visual aid for linear models and analysis of variance'.
- Isobel Falconer spent 10 days at the Cavendish Laboratory in Cambridge, advising on cataloguing their collection of historic photographs and doing research on J. D. Forbes, a Scottish physicist who worked on the conduction of heat and seismology and became Principal of the United College of St Andrews from 1860-68.

Grants

- Alan Cairns is a co-investigator on an EPSRC grant of £761,616 awarded to Dr Kevin Ronald of the University of Strathclyde. The grant, which will run for three years from October, is for a project entitled 'Parametric wave coupling and non-linear mixing in plasma'. Alan's role will be to use his expertise in the theory of plasma waves in support of experimental work at Strathclyde.

Mysterious Object

- A new and strange feature has mysteriously appeared in the Level 2 corridor on the north side of the Mathematical Institute (the corridor with the secretaries' offices). Have you spotted it yet?

Future Events – Copson Lecture

- After an 8-year-long hiatus, our School's *Copson Lecture Series* will be continued on Friday 22nd September, 5.15pm, venue to be announced. The Lecture will be given by Vicky Neale, who is Whitehead Lecturer at the Mathematical Institute, University of Oxford and Supernumerary Fellow at Balliol College. The lecture will be entitled 'Closing the gap: the quest to understand prime numbers'. Vicky has sent the following summary:

Prime numbers have intrigued, inspired and infuriated mathematicians for millennia, and yet mathematicians' difficulty with answering simple questions about them reveals their depth and subtlety.

Join Vicky to learn about recent progress towards proving the famous *Twin Primes Conjecture*, and to hear the very different ways in which these breakthroughs have been made: a solo mathematician working in isolation, a young mathematician displaying creativity at the start of a career, a large collaboration that reveals much about how mathematicians go about their work.

Next Issue

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