School of Mathematics and Statistics Newsletter

July 2022

Congratulations …

• to Saul Freedman on passing his PhD viva on 6th July for his thesis 'Diameters of graphs related to groups and base sizes of primitive groups'.

• to Yunchen Xiao on passing his PhD viva on 6th July for his thesis 'Applications of likelihood-free parameter inference methods on numerical models of cancer invasion'.

• to Mark Chaplain and Sara Hamis, along with co-authors, who were awarded the 2023 Lee A. Segel Prize of the *Society for Mathematical Biology* for the best paper in the *Bulletin of Mathematical Biology* over the past 2 years. The prize honours outstanding contributions to mathematical biology and helps to promote research in the area. The paper is 'Targeting Cellular DNA Damage Responses in Cancer: An In Vitro-Calibrated Agent-Based Model Simulating Monolayer and Spheroid Treatment Responses to ATR-Inhibiting Drugs' by S. Hamis, J. Yates, M.A.J. Chaplain, G.G. Powathil, Bulletin of Mathematical Biology 83(10):103 (2021). Mark was also an author on the paper that won this prize in 2014.

• to Stephanie Yardley, a PDRA with Duncan Mackay until December 2020 for winning the 2022 Solar Physics *Kees de Jager Prize* for the best article in the journal *Solar Physics* over the last 12 months. The paper 'Simulating the Coronal Evolution of Bipolar Active Regions to Investigate the Formation of Flux Ropes' by S.L. Yardley, D.H. Mackay and L.M. Green, Solar Physics 296, 10 (2021) used a suite of magnetic field modelling software developed by Duncan Mackay and Gordon Gibb through STFC IAA money.

Welcome ...

• to Dan Lucas who joined us as a Lecturer in Computational Mathematics in June. Dan took his MMath and PhD degrees in St Andrews some years ago, and has since held posts in Bristol, Dublin and Cambridge, and most recently as a lecturer at Keele University. His research interests are in fluid turbulence, and on the teaching side he focusses on innovative methods to teaching computational methods and programming to mathematicians.

• to Cosima Breu who has joined the Solar Group as a post-doctoral researcher, working with Ineke on coronal heating. Cosima recently finished her PhD at the Max Planck Institute for Solar System Research at Göttingen, and previously visited St Andrews when attending the Coronal Loops Workshop in St Andrews three years ago.

Talks and Visits

• Between 19-26th June, Nicolò Margaritella visited the School of Econometrics and Management of Lund University in Sweden to work with a colleague on a project involving modelling environmental time series with Bayesian functional data models. The visit was supported by an LMS Research in Pairs grant.

• Jon Fraser gave a talk entitled 'An expanded Sullivan dictionary via dimension interpolation' on 15th June at the *One Day Ergodic Theory Meeting*, hosted by University of Exeter.

- Five members of the Analysis Group attended the meeting *Geometry of Deterministic and Random Fractals* from 27th June-1st July, celebrating Károly Simon's 60+1th birthday, at the Budapest University of Technology and Economics. Istvan Kolossvary was one of the conference organisers and Amlan Banaji, Kenneth Falconer, Natalia Jurga and Alex Rutar all gave talks. With temperatures of 37˚C, conference participants took the opportunity to cool off in a nearby lake during the free afternoon excursion.

- Amlan Banaji, Istvan Kolossvary and Alex Rutar attended the *Rényi 100 Conference* celebrating the 100th birthday of Alfred Rényi. The conference was held at the Hungarian Academy of Sciences in Budapest from 20th-23rd June.

- Peter Cameron attended the *Third International Conference on Group Theory* in Florence, an in-person conference, where he spoke on 1st July on 'Classes of groups defined by graphs'. Back in Britain, he talked at the *Postgraduate Group Theory Conference* in London a week later, on 'Graphs on groups'. One of the organisers of this conference was former School president Kamilla Rekvényi, currently finishing her PhD at Imperial College.

- Lilli Nadol, Thomas Neukirch, and Jack Reid participated in the *48th Conference on Plasma Physics*, hosted by the European Physical Society (EPS), from 27th June-1st July. In light of covid the organizers reverted at the start of the year to an online format, having initially planned a meeting in Maastricht in the Netherlands. Jack contributed a talk on 'MHD avalanches in magnetized solar plasma: proliferation and heating in coronal arcades'. Lilli presented two posters 'Coronal magnetic field extrapolation using a specific family of analytical 3d magnetohydrostatic equilibria - practical aspects' and 'Force-free Collisionless Current Sheets: A Systematic Method for Adding Asymmetries', and Thomas presented a poster entitles 'Kinetic models of solar wind current sheet'.

- Solar Group members Rachel Davies, Tom Howson, Kate Mowbray, Lilli Nadol, David Pascoe, Jack Reid, Ann Vaseekar, and Andy Wright attended the *Royal Astronomical Society National Astronomy Meeting 2022*, a hybrid event from 11-15th July at the University of Warwick. Tom and Jack organised a session 'New light on solar coronal heating: convergence of theory, numerical models, and observations', in which Jack also gave an (online) talk. Jack also presented two online posters. Further talks were given by Kate Mowbray, Lilli Nadol (online), Thomas Neukirch, and David Pascoe, and Tom Howson.

- From 4-7th July, Rosemary Bailey attended the *Twelfth Working Seminar on Statistical Methods in Variety Testing* at Słupia Wielka in Poland. For most people, this was an in-person event, but fortunately the organizers were able to allow a few people with travel difficulties to attend remotely. Rosemary gave a talk on 'Valid restricted randomization for small experiments'. This included some of the results found by former St Andrews undergraduate Josh Paik during a summer research project.

- Peter Jupp attended (alas only virtually) the workshop *ADISTA 22: Advances in Directional Statistics* at the University of Santiago de Compostela on 15-17th June and the 2022 *Annual Meeting of the Institute of Mathematical Statistics* in London a week later. At each meeting he spoke on 'Geological features, parallel lines and circular statistics'.

- Isobel Falconer attended the *General Assembly of the International Mathematical Union* (*IMU*) in Helsinki on 3rd-5th July, where she was re-elected as IMU representative on the International Commission on the History of Mathematics for the next 4 years, and she then attended the Fields Medal ceremony.

- On 28-29th June, Isobel Falconer, Deborah Kent, and four of our undergraduate summer or project students (Emma Baxter, Joel Beckles, Megan Briers, Leo Doherty) were invited participants at the *Observatories Networks* meeting in Edinburgh. The meeting at the Royal Observatory Edinburgh included tours of the Observatory and the 19th century Observatory site on Calton Hill, Edinburgh.

- On 2nd July, Isobel Falconer, Kate Hindle, and Deborah Kent attended the *History of Mathematics and Flight* conference in the Concorde Suite at Manchester Airport. Kate presented her work on D'Arcy Thompson and the flight of birds, Deborah spoke on Peter Guthrie Tait and the flight of golf balls, and Isobel talked about James Bell Pettigrew (St Andrews Professor of Medicine and Anatomy from 1875-1908) and his work on the flight of insects, birds and early aeroplanes.

- David Dritschel participated in the *Festival de Théorie* in Aix en Provence from 4-8th July. He gave two talks on the late time behaviour of inviscid geophysical flows and on reduced models in geophysical flows. The Festival coincides with the Arts Festival throughout July.

- Cornelia Oedekoven visited the *Gilkey International Middle School* in Portland, Oregon and talked to 7th and 8th grade students about distance sampling and mark-recapture surveys of cetaceans in the Pacific Ocean.

Caption Competition

- Suggestions are invited for captions for this picture of three-year-old Dylan Fraser at the board of Lecture Theatre C. Send your suggestions to the editor - the best will be included in the next Newsletter.

Next Issue

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