

School of Mathematics and Statistics Newsletter

September 2024

Congratulations to ...

- Jon Fraser who has been awarded an EPSRC *Open Fellowship* for a project 'A new theory of dimension interpolation'. This is a £1.4M five year grant which will allow Jon to dedicate his time entirely to the project, and will provide two PDRAs and two PhD students.
- Scott Harper, currently an EPSRC Postdoctoral Fellow in St Andrews, on his appointment to a *125th Anniversary Fellowship* at the University of Birmingham from April 2025. This is a permanent lectureship that starts with five years protected for research.
- Yifei Qian, who defended his PhD by portfolio entitled 'Towards fully automated analysis of crowd counting in images'. Yifei demonstrated advances in counting crowds of humans in the face of image clutter and difficult perspectives, and also penguins in images that feature penguin-coloured backgrounds and varying illumination angles.
- Yuheng Wang on a successful defence on 19th August of his PhD thesis entitled 'Statistical inference in acoustics capture-recapture: integrating machine learning for species Identification'.
- three St Andrews undergraduates who made a clean sweep in the *British Society for the History of Mathematics 2023-24 Undergraduate Essay Competition*.

Joint Winners were:

Andrew Halyburton, 'The diffusion of Hindu-Arabic numerals throughout late medieval Europe and contemporary religious perspectives'.

David Thorsteinsson, 'Quantity, culture, and cognition: the role of agriculture in shaping numerical concepts'.

The runner up was:

Carys Williams, 'Hilbert's Paris Problems: the impact of the 100 year hiatus in the history of the 24th Problem'.

Welcome to ...

- Regina Bispo who joined the School as a Lecturer in Statistics on 1st September, to work in CREEM. She was previously Assistant Professor in the Department of Mathematics of Universidade NOVA de Lisboa in Portugal. She was an elected member of the board of directors of the Portuguese Statistical Society.
- Firdavs Rakhmonov who started a 3.5 year Leverhulme trust PDRA position on 1st September. Firdavs completed his PhD recently at the University of Rochester, USA. His research interests include additive combinatorics, geometric measure theory, and discrete geometry and he will work in the Analysis group with Jonathan Fraser on a project in Fourier analysis.
- Andrew Reid, who will join us as an Undergraduate Administrator on 16th September.
- Robbie Mill, who started as a Postgraduate/ Undergraduate Administrator on 9th September. Robbie originally joined us as an apprentice in September 2022.

- our new research students: *Algebra*: Violeta Lopez, Theodor Thorbjornsen, Struan McCartney, Callum Barber; *Analysis*: Lijian Yang, Tianyi Feng, Yunlong Xu; *Solar Theory*: Qihui Ming, James Brooks; *Computational Maths*: Stefan Faaland, Yilin Wang; *Mathematical Biology*: Jim Yang; *Statistical Ecology*: Rebecca Supple, Yuexin Wu, Oliver Hartley, Dinah Hartmann, Sarah Rehman.

Visitors

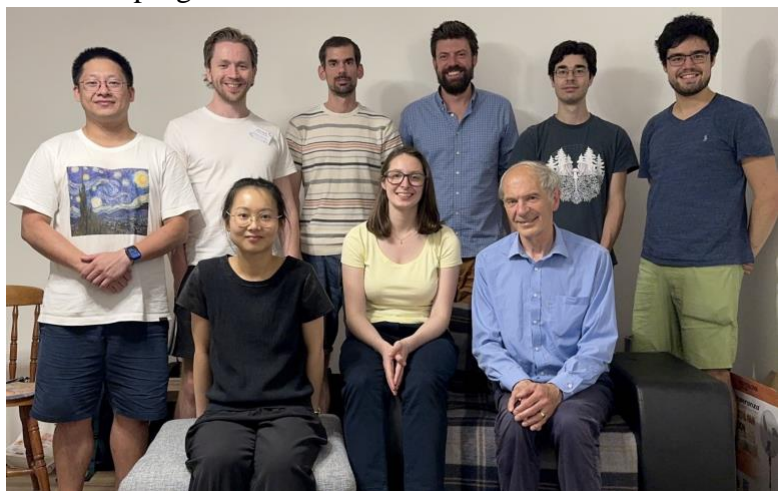
- Craig Miller from York (formerly of St Andrews) visited Nik Ruskuc, Matthew Brookes and Jung Cho from 20th-23rd August to work on Noetherian and Howson properties for semigroups.
- Giusi Capobianco, a PhD student from Roma Tor Vergata, is visiting Yoav Len for the second time to continue working on the Brill-Noether theory of metric graphs.
- Godofredo Iommi (UC Chile in Santiago) visited for the first week of September to work with Mike Todd and Boyuan Zhao on ideas around thermodynamic formalism for null recurrent systems.
- Pdraig Ó Catháin (Dublin City University) visited Sophie Huczynska and Laura Johnson during the week beginning 2nd September to work on a joint project.

Conferences, Talks and Visits

- Several members of the School attended the *Royal Statistical Society International Conference 2024* in Brighton from 2nd-5th September. David Borchers gave the Barnett Lecture and an invited talk 'Learn from my mistakes' in a session organised by the Young Statisticians section of the RSS. Michael Papathomas gave a talk entitled 'How are poverty and environmental factors jointly associated with the risk of antibacterial resistance in East Africa?' and also co-organised two sessions on the analysis of compositional data. Ben Swallow attended as a member of the Conference Board and also participated in the Discussion Meeting on 'Analysis of citizen science data', acting as discussant and proposer of the vote of thanks. Discussion papers have a long history and tradition at the RSS, where submitted comments and replies from the author are published alongside the original paper
- Several members of the School attended parts of a semester programme *Fractals and Hyperbolic Dynamical Systems* at the Erdős Centre and Rényi Institute in Budapest. From 12th-23rd August the programme covered probabilistic and statistical aspects of dynamical systems, with a school with mini-courses for the first week and a workshop in the second week. Saeed Shaabanian attended both weeks, and Mike Todd was an invited speaker for the workshop. The Hungarian National Day was on the Tuesday which involved lots of fireworks over the Danube!

Then from August 26th-September 6th the programme focussed on deterministic and random fractals, again with a week-long school followed by a workshop. Ana de Orellana attended both weeks and spoke at the workshop, Kenneth Falconer gave the opening talk at the workshop, and Jon Fraser gave a plenary talk.

Present and recent past members of the School at the fractals workshop



- Lindsay Scott-Hayward, Monique Mackenzie and their MSc(Res) student Callum Clarke had a successful two week trip to Namibia in July. The first week was a community and stakeholder workshop for the *REDAA (Reversing Environmental Degradation in Africa and Asia)* project ‘Understanding the dynamics of wildlife populations in hyper-arid north-west Namibia for improved post-drought recovery whilst maximizing livelihood benefits’, funded by FCDO (Foreign, Commonwealth and Development Office). This involved project partners and representatives from 26 conservancies in the region discussing, jointly in English and Otjiherero, drivers for the declines in plains game animals. The second week focussed on work with the Namibian ministry improving existing work and developing the use case for Callum’s project ‘Namibian Hyena ecology, behaviour classification and feeding site identification using remote sensed collar data’.



The workshop in Namibia

- Danielle Harris from CREEM remotely attended the *4th African Bioacoustics Conference*, held in Cape Town from 2nd-6th September, where she gave a presentation about large-scale monitoring of whales in the Indian Ocean using acoustic data.
- Nik Ruskuc is visiting Peter Mayr at Boulder, Colorado, from 2nd-19th September. They are continuing their work on Boolean powers and their automorphism groups.
- Andy Lynch ran a two-day workshop in St Andrews in August for the *UK ICGC Prostate Cancer Analysis Network*, supported by the Isaac Newton Institute. As well as addressing some statistical and computational analysis problems in cancer biology, the delegates enjoyed following Isobel’s Mathematical and Scientific [Walk Around St Andrews](#) (albeit with many mutinous queries as to why they passed so many pubs, cafes, and ice-cream parlours without entering them!).
- Nikos Sfakianakis gave a plenary lecture at a workshop *The Mathematical Hallmarks of Cancer*, from 19th-23rd August at the Fields Institute, Toronto, his title being ‘The mathematical hallmarks of cancer: yesterday, today, and tomorrow’.
- Cosima Breu, Harry Callingham, Daniel Johnson, Jonah Klowss, Anmol Kumar, Thomas Neukirch and Alex Russell are attending the *17th European Solar Physics Meeting* in Turin, Italy, from 9-13th September. Elisabeth Enerhaug, now in the ‘University of Oslo’ phase of her PhD, also attended. Alex gave a talk and all the others presented posters. The meeting was originally scheduled for September 2020, but due to Covid was first postponed to 2021 when an online replacement was organised, but the proper in-person conference took place now, only four years later!
- Tom Elsdén attended an *International Space Science Institute (ISSI)* workshop in Bern from 2nd-6th September, studying surface waves across the heliosphere. One of the group leads, Katariina Nykyri, (NASA) was an old postdoc of Peter Cargill at Imperial – it’s a small world! Tom also attended the *UK Space Weather and Space Environment* meeting in Exeter from 9-12th September, giving an invited talk on MHD waves in asymmetric media. He followed this with a research visit to Plymouth to visit David Southwood, Andy Wright’s PhD supervisor, to continue their work on plasmopause surface waves.

- From 26-30th August, Lilli Nadol and Thomas Neukirch attended the second meeting of the ISSI Team on ‘Magnetohydrostatic Modelling of the Solar Atmosphere with New Datasets’ in Bern, Switzerland. Both gave talks on the use of analytical magnetohydrostatic equilibrium solutions to model the magnetic field in the solar atmosphere.
- *PiFORUM24*, the *Piscopia Initiative Annual Conference*, took place at the University of Leicester from 2nd-3rd September, bringing together over eighty women and maths students of underrepresented genders, from freshers to postdocs. This included a mini-symposium on EDI in Mathematics, featuring Brigitte Stenhouse (Open University) from the History for Diversity in Mathematics Network, and a social origami session making a rhombic triacontahedron! Our students Hanna Andrejczuk, Lilian Contius, Victoria Ironmonger and Yayi Zhu attended; Victoria was part of the organising team along with Jung Won Cho. Yayi gave a talk on ‘Presentations for ideals in the full transformation monoid’ and Hanna spoke on ‘Modelling the formation and coalescence of zonal jets’, based on a summer project supervised by Daphné Lemasquerier and Richard Scott.
- On 5-6th September, Isobel Falconer organised a successful workshop at the University of Manchester for the INI-funded *History for Diversity in Mathematics* network. Twenty enthusiastic participants took up the topic of ‘working with resources’, identifying teaching situations where they might want to use history of maths, locating primary and secondary sources, discussing how to embed them in teaching materials, and how to evaluate the outcomes.

Other News

- Lindesay Scott-Hayward has taken over from Louise Burt as head of CREEM-CRU (Contract Research Unit). Thanks to Louise for all her work over the years.

Future Events

- The first meeting of the *Scottish Dynamics Network*, a new network that involves St Andrews, Glasgow and Heriot Watt universities, will take place in Glasgow on Friday 20th Sept, see [this link](#).

Next Issue

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