



The School of Mathematics Newsletter

Per Ardua ad Alta! Our Equality and Diversity Champions

by ANDREW MORRIS AND ANDREW TREGLOWN

BIG SMILES, KINDS HEARTS, GRAND PLANS FOR THE FUTURE! These exclusive photos celebrate the School's tremendous success, as reported previously, championing equality and diversity at the University. The former School of Mathematics student, Jack Garner (below), was recognised as *Alumnus of the Year* by the University in 2019. His extraordinary achievements are recorded in [OldJoe](#) whilst his groundbreaking climb up Europe's highest mountain has been published by the [BBC](#). Meanwhile, the School of Mathematics has recently secured an Athena Swan Bronze Award, which will run until November 2022.



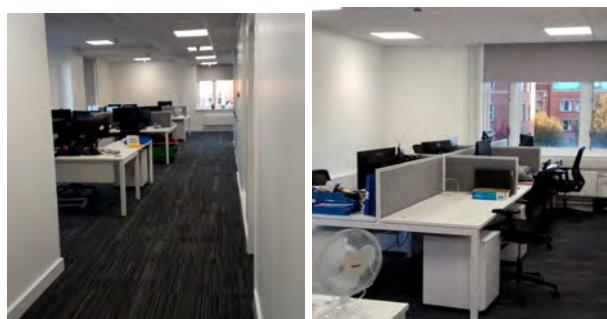
Dirk Hermans, Jack Garner, Susana Gutierrez & Simon Goodwin celebrate the *Alumnus of the Year* award (left); Alexandra Tzella & Rosemary Dyson receive the Athena Swan Bronze Award (right)

New Poynting Admin Hub Opens

by JENNIFER CLERICI

The newly refurbished Poynting Admin Hub (PAH) was officially opened at 4pm on Monday 30 September 2019. It is the new home for the education support teams (UG, GT, PGR) and wellbeing for both the School of Mathematics and the School of Physics and Astronomy.

The official beginning of this new joint venture was marked by both Heads of School and celebrated with refreshments.



The newly refurbished and redesigned PAH

The redesign includes an open-plan office, the Wellbeing drop-in space, an extended kitchen and storage room, and the Poynting Lounge.

Farewell to Hoff

by CHRIS PARKER

This summer Hoff decided to move on to new pastures. For 13 years, he was a treasured member of the School and, in particular, of the algebra group. Hoff has taken up a position in the “real” world and now works in London.



Corneliu Hoffman (Hoff)

Hoff is a Fellow of the Higher Education Academy and was nominated by the Guild of Students for the Outstanding Teaching Award in 2016.

His research interests range through group theory, Galois theory and representation theory. He was host to Rieuvert Blok (August 2015 to July 2017) on his EU grant and they together produced a series of papers, one joint with Sergey Shpectorov, that considered Curtis-Tits groups and related amalgams.

On the same project, Hoff initiated the use of the Coq proof assistant in undergraduate projects. Hoff was also active in postgraduate supervision, his latest two students are Mark Butler and Jack Saunders.

Kay Magaard Memorial Conference

by CHRIS PARKER

In September 2019, a **conference** commemorating the life and mathematics of our former colleague Kay Magaard was held in Warwick. The organisers were Inna Capdeboscq and Cornelius Hoffman and the speakers included many of Kay’s collaborators from around the world. Among the guests were Kay’s parents Lorenz and Ursula, his wife Terrie and his two children Lorenz and Carlo.

In June/July next year, a special issue of the *Journal of Algebra* will be published to commemorate Kay’s mathematical works. This will coincide with the final workshop of the INI programme *Groups, representations and applications: new perspectives* of which Kay was one of the organisers.

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Welcome to New Members of Staff

SIMON BAKER joined the School as part of the JBJI faculty. He is interested in topics from Ergodic Theory, Fractal Geometry, and Number Theory. He is especially interested in how these three areas meet in overlapping iterated function systems.

Simon completed his PhD at the University of Manchester in 2014 under the supervision of Prof Richard Sharp and Dr Nikita Sidorov. He subsequently held postdoctoral positions in Utrecht, Manchester, Reading, and Warwick.

Outside of mathematics Simon is a keen sportsman. He enjoys football, tennis, and running.



Simon Baker

RACHEL BURGESS started her role as Outreach and Schools Liaison Officer at the University in May. Her role involves organising and delivering outreach events in the School of Mathematics and across the College to schools in the West Midlands. If you are interested in any outreach opportunities please contact her on r.burgess@bham.ac.uk.



Rachel Burgess

SABRINA KOMBRINK joined the School of Mathematics in October. She is interested in geometrically characterising highly irregular objects as well as in the question if one can hear the shape of a fractal drum. Sabrina has held positions at the University of Bremen, the University of Luebeck and Institut Mittag-Leffler. Before joining the University of Birmingham she was a substitute professor of Mathematics at the University of Goettingen.



Sabrina Kombrink

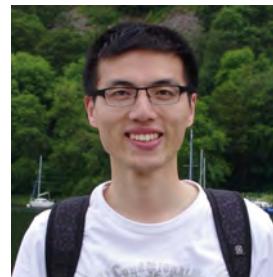
EOIN LONG joined the School as a Lecturer in Combinatorics in August. Eoin's research interests primarily lie in Extremal and Probabilistic Combinatorics, with an emphasis on Extremal Set Theory, Graph Theory and topics related to the Probabilistic Method in Combinatorics. He completed his PhD at the University of Cambridge under the supervision of Prof Imre Leader and has since held postdoctoral positions at the University of Oxford, Tel-Aviv University and Queen Mary, University of London.



Eoin Long

XIAOCHENG SHANG joined the School as a Lecturer in Mathematics and Statistics in July. Xiaocheng obtained his PhD in Applied and Computational Mathematics under the supervision of Professor Ben Leimkuhler from the University of Edinburgh in 2016. Before moving to Birmingham, he held postdoctoral positions at Edinburgh, Brown

University, and ETH Zurich. His primary research interests lie in the optimal design of numerical methods for stochastic differential equations with emphasis on applications ranging from computational mathematics, statistics, physics, to data science.



Xiaocheng Shang

Joint Chairs Update

by DAVE SMITH

As announced in the previous newsletter, we are delighted that **PROFESSOR JOHN TERRY** has now joined us from the University of Exeter, in a joint chair between the Schools of Mathematics and Computer Science, and the Institute for Metabolism and Systems Research. John is a leader in mathematics in healthcare; his research focuses on the application of dynamical systems research to improve the diagnosis and treatment of disorders such epilepsy and endocrine (hormonal) dysfunction. His recruitment moves the EPSRC Centre for Predictive Modelling in Healthcare to Birmingham and several independent Fellowship holders, combined with a major University investment, creating new opportunities to apply mathematical and computational expertise to develop new life-saving therapies.

We are also delighted to welcome **PROFESSOR DYLAN OWEN**, who joins the University of Birmingham as an Interdisciplinary Professorial Fellow, from his previous position at King's College London. Dylan will work jointly between the Institute for Immunology and Immunotherapy and the School of Mathematics. Dylan is an expert in the technique of superresolution microscopy, which enables tiny living structures much smaller than the wavelength of light, for example membrane proteins, to be detected and analysed. The cutting-edge mathematical techniques deployed include Bayesian clustering and topological data analysis. Dylan and his group use these techniques to understand the function of T cells, a major component of the immune system.

Congratulations! Our Recipients of Grants, Prizes and Scholarships

• Centre Fellowship for Meurig Gallagher

MEURIG GALLAGHER has secured a 3 year Centre Fellowship with John Terry. He will start the post in January, 50% his own project 'My-I' on clinical translation of sperm motility algorithms, and 50% pump-priming new collaborations between mathematics and medicine.

• QJMAM Fund for Xiaocheng Shang

XIAOCHENG SHANG has recently been awarded the QJMAM Fund for Applied Mathematics from the Institute of Mathematics and its Applications (**IMA**). This will support his attendance at the SIAM Conference on Mathematical Aspects of Materials Science in Bilbao, Spain.

Xiaocheng is also organising a minisymposium there on *Computational Statistical Physics and Related Fields*, inviting a number of leading figures working on the related areas to present their work in the minisymposium.

• European Prize for Richard Montgomery

RICHARD MONTGOMERY was awarded the prestigious European Prize in Combinatorics at the European Conference on Combinatorics, Graph Theory and Applications **EUROCOMB 2019** in Bratislava, Slovakia.

The biennial prize recognises excellent contributions in Combinatorics, Discrete Mathematics and their Applications by EU researchers not older than 35. It has been award since **2003** and carries cash award of €2,500.

• Alumni Graduate Scholarships

The School has been supported by a donation from an alumnus. This has been used to support two postgraduate PhD fellowships for students who are also alumni from the School.

The inaugural recipients are **RICKY HUTCHINS** (supervised by Olga Maleva) and **SOPHIE MASON** (supervised by John Terry).

We intend to recruit at least two more alumni to this exciting scheme next year.

Outreach Update

by RACHEL BURGESS

Since the last outreach update staff across the school have taken part in many events so thank you to those people. In June, Dr Sara Jabbari took part in Discovery day which is an event for Year 10 students aiming to encourage them to consider a STEM subject beyond GCSE: 112 pupils attended from 8 schools and had an opportunity to attend workshops led by academics across the College.

In July Dr Simon Goodwin, Dr Richard Mycroft and Dr Dan Jones delivered talks to the 70 year 12 students who attended the Maths Taster Day. Professor Rob Curtis also volunteered on the day to deliver an interactive workshop that encouraged problem solving and teamwork. Feedback from this event showed that 71% of attendees were more likely to apply to UoB as a result of today so I feel the event really showcased what the school offers to students.

In September Dr Alexandra Tzella delivered her first outreach workshop for Girls in STEM which is an event aimed at Year 9 girls to raise aspirations and encourage an interest in STEM subjects through GCSE and beyond. 220 pupils attended from 18 different schools across the West Midlands and although the feedback is still yet to be analysed, school teachers have passed on their appreciation of the event to inspire young girls into STEM.

The next event coming up is Year 8 Maths Day on 23rd October where maths students Matthew Henley, Sam Davies and Ethan Thompson have helped to create a workshop. We hope to use this workshop regularly in the future as it is suitable for year 8 and below allowing us to provide content for younger age groups. Michael Grove is also delivering a short talk to inspire young people to consider maths as a career in the future.

Also, the Birmingham Popular Maths Lecture Series is starting this month on Wednesday 23rd October with a talk by Dr Panayiota Katsamba on Designing Microbots. The lectures are run throughout the autumn and spring terms on the last Wednesday of the month and are welcome to staff, students and the general public. Dr Dan Jones and Meurig Gallagher will also be delivering talks in November and January respectively. You can find out more about the upcoming lectures [online](#).

For those of you who may be interested in delivering outreach activities but need some more guid-

ance, we are running a training session across the college on Wednesday 20th November 14:00-16:30 in G42 in the Engineering Building. The training will focus on:

- What is outreach and why it is important (WP, Recruitment, REF etc)
- How to tailor your research or your message to different age groups
- General confidence in public speaking
- Where and who to approach if you are interested in outreach

The training session is being led by Jon Wood in Chemical Engineering but Dr Sara Jabbari has also offered to provide insight into how she manages her time to fit in outreach and why this is important. If you would like to attend this training session please email epsoutreach@contacts.bham.ac.uk

Virtual Plant Cell Laboratory

by GALANE LUO

Plant mechanics is going futuristic. Using virtual reality technology, we have developed an interactive learning tool that highlights the value of mathematical modelling in the study of plants.

The user, fully immersed in the virtual environment while wearing the VR headset, can learn the basics of plant cell mechanics from a mini-tutorial with animated 3D visual aids. They can then 'design' plant cells by choosing parameters that control mechanical properties, and watch simulated growths of those cells.

Our latest model of plant cell mechanics, which we have programmed into the software to calculate growth variables in real time, drives the 3D animations of cell growth. When we demonstrated the software on the September open day, responses from prospective students who experienced it first-hand were excellent.

We plan to engage with more students and wider audiences in future, promoting mathematical plant science everywhere we go. The UoB Alumni Impact Fund supports the development of the Virtual Plant Cell Lab.



The Virtual Plant Cell Laboratory



The Virtual Plant Cell Laboratory in operation

MICROBOTS at Thinktank Lates

by DAVE SMITH

Meurig Gallagher, Gemma Cupples, Sara Jabbari and Tom Montenegro-Johnson (and a team of helpers) have been working to develop a public engagement exhibit for the Birmingham Thinktank (Science Museum).

The MICROBOTS exhibit they have put together is incredibly ingenious from technical, scientific and artistic perspectives. It involves robotics, real-time image capture and analysis, integrated with a computer game, all with the aim of engaging the public with therapies for antimicrobial resistance, micro-robotic drug delivery mechanisms, and mathematical detection of cells from images. It really needs to be seen to be believed.

The exhibit was [launched](#) at Thinktank Lates in October. Photos will be included in the next edition. Tickets are free and highly recommended!

Joint Birmingham-Jinan Institute Update

by RACHEL DU CROZ

JBJI welcomed its third cohort of students this September in collaboration with JNU in Guangzhou, China. The total number of Mathematics students enrolled is now just under 520. The two week orientation for new students was attended by Chris Good, Rob Leek, Penny Barber and Rachel Du Croz.

Orientation in China is quite different to Welcome Week in the UK, with lots of student competitions in areas such as Martial Arts, Pose, Dance, Writing and Music. Schools compete against each other and the JBJI came second in Martial Arts and Pose, and third overall out of 36 schools at JNU.

On a more academic front welcome lectures about JBJI, The University of Birmingham and the UK were given to parents and students by Professor Jon Frampton, Director of the China Institute and Prof Chris Good, Deputy Dean of JBJI.

We are delighted that Sabrina Kombrink, Simon Baker, Daniel Jones and Xiaocheng Shang have joined our teaching team; Dan and Xiaocheng are already undertaking teaching over at JBJI, with Sabrina going out in December and Simon in the Spring.

In the summer the first JBJI Summer School was attended by 12 students. The summer school was led by Chris Parker with guest lectures provided by Marta Mazzocco, Chris Good, Michal Kocvara, and Sara Jabbari. The main theme of the school was Cryptography, and a trip to Bletchley Park was in-

corporated into the social programme along with a film night to watch The Imitation Game. The BIA were also able to support the students by running sessions on Academic English and English Culture.

It wasn't all hard work though, and a social programme including trips to London to see Mama Mia in the west end, the London Eye, and Madam Tussauds, Manchester and Liverpool were included, along with local trips to Cadbury World and the Black Country Living Museum.

In September, the School also welcomed its first cohort of Study Abroad students to the UK from JBJI with 17 students joining year 3 of the programme.

On 23 and 24 October the Vice Chancellor will be visiting JBJI and planting a tree at the Panyu Campus which is home to JBJI, this visit also marks eight years of the University of Birmingham's partnership with Guangzhou Municipal Government.

Over the next year we will be launching the next summer school, as well as preparing for another round of study abroad and we are hoping to welcome 300 more students onto one of the four programmes running.

As ever, those wanting to know more about JBJI please get in touch with Chris Good or Rachel Du Croz. If anyone would like to be involved with the 2020 summer school please contact Rachel Du Croz.



JBJI Study Abroad 2019