UNIVERSITY OF BIRMINGHAM

SCHOOL OF BIOSCIENCES

The Mole

The Biosciences Newsletter | September 2022

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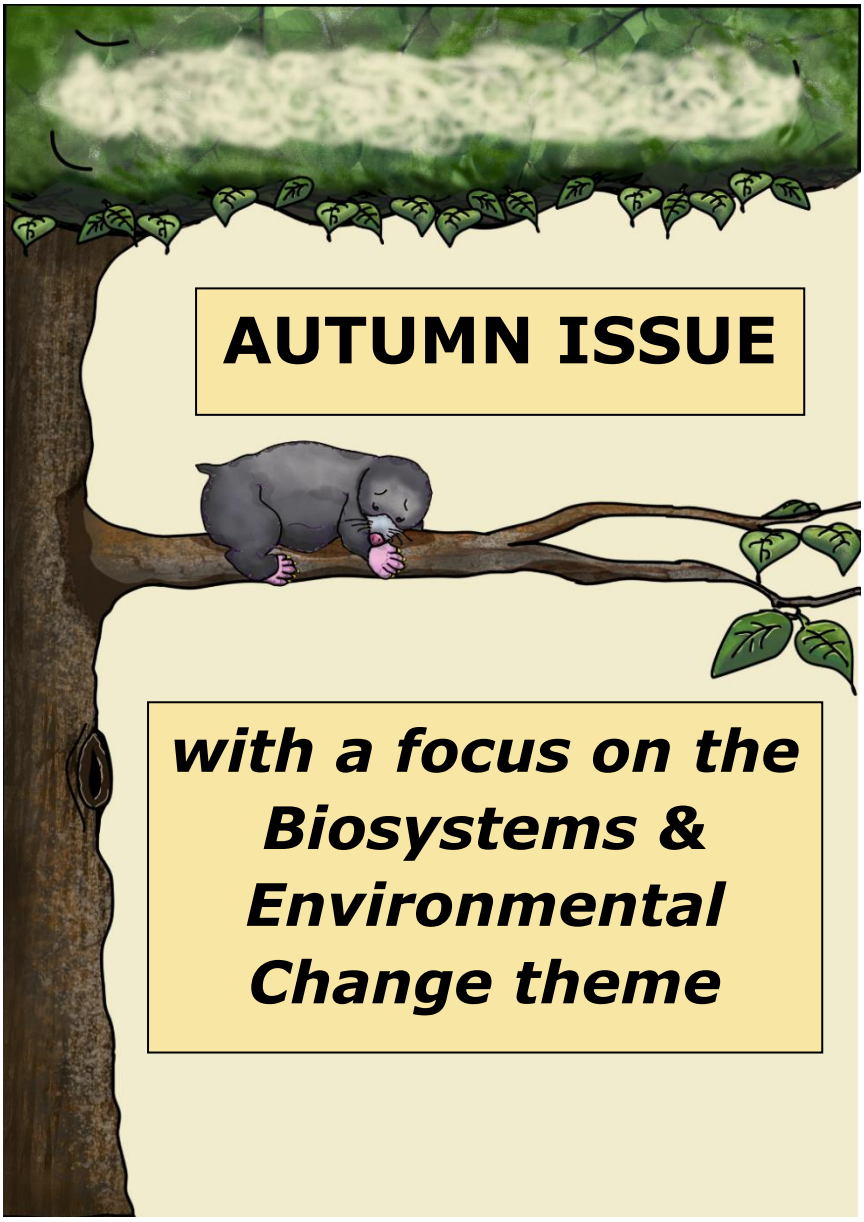


Editorial by Julia Myatt (Biosciences Head of Education) & Jim Reynolds (theme coordinator for Biosystems and Environmental Change)

Welcome to this themed issue of the Mole. We want to provide some reflections on research-led teaching in our School, which is what the School is all about! Driving our theme are the threats to animals and plants posed by the Anthropocene, the current geological age in which human activities are having a dominant influence on the climate and the environment. Our theme members provide new information about biodiversity and ecosystem function that underpins many core modules in the first year of our undergraduate degree programmes, preparing students for their future studies. The challenges to biodiversity and environmental health are huge as we strive to live comfortably despite climate extremes, to cope with rising energy costs, and to fulfil our legal obligations to Net Zero by 2050.

Our students will be "in the firing line" as trained bioscientists in ensuring that we meet these challenges "head on". Therefore, it is contingent on us to ensure that, through our teaching, students are aware of these challenges and are equipped to engage with them. Our theme has fully embraced this, not only through our teaching on individual modules, but through our bigger initiatives. This month sees the official start of our new Human Sciences undergraduate programme (led by Mary Blanchard) that will include interdisciplinary cross-College teaching, developing skills in students to become effective researchers, policy-makers and leaders. Our theme members will also contribute to modules in the new Global Environmental Change and Sustainability programme (led by GEES). For both research and teaching, when we cross over 'traditional' discipline-specific boundaries, we are able to address more interesting questions, tackle bigger challenges and educate more effectively.

The Editor adds: *Please enjoy this issue, focussing on the Biosystems and Environmental Change research theme, which arguably, itself, has undergone rapid and radical change since last visited by the Mole. Of course, the issue also carries the latest news, as well as all your other favourite items. Please remember that our door metaphorically is always open for fresh ideas for feature in future issues, as well as copy and photos, anytime.*

Dr Jim Reynolds, theme coordinator, introduces Biosystems & Environmental Change:

Of all the Biosciences research themes, ours must be the most diverse, with research taking place in both the laboratory and the field. We investigate pattern and process at many spatial and temporal scales, thus, from microscopic to global scales through centuries of natural archives. The disciplines examined by theme members are many and varied. They include animal cognition, animal and plant population demographics and dynamics, biotelemetry, ecology, genomics and metabolomics, data science and toxicology. Research areas go well beyond the traditional bioscience laboratory setting to the forests of Staffordshire (i.e. BIFoR) and South America, isolated tropical oceanic islands, Antarctica, and zoos, wildlife sanctuaries and reserves in the Far East.

Despite such diversity, we are united by our wish to understand the impacts on the natural world of *change*, with much of it being anthropogenic. We strive to understand how populations and their constituent organisms respond to threats from alien and invasive species, chemical pollutants, climate change, habitat fragmentation and loss, and overharvesting. Research is heavily reliant on a deep understanding of the fundamental biology of model species such as chironomid midges (*Eretmoptera murphyi*), orangutans (*Pongo pygmaeus*), sooty terns (*Onychoprion fuscatus*), and water fleas (*Daphnia major*) (to name just a few), and their responses to ongoing severe environmental challenges. Our theme particularly has strength in bioinformatics that is imperative in collecting, analysing and interpreting "big data" in our various lines of scientific enquiry.

Check out the Biosystems and Environmental Change theme, including people and research spotlights at:
https://www.birmingham.ac.uk/research/activity/biosystems-environmental-change

The Norway field trip

Scott Hayward writes: Since 2010, Jerry Pritchard and I have run the Alpine Glacial Ecology field course to Finse in Norway. This provides students with a range of field research skills in an environment at the very front line of climate change (we literally take them to the snout of a glacier). Relatively low levels of biodiversity also mean that students can quickly get "ownership" of identifying species within terrestrial and aquatic communities. In addition, the students get training in developing research objectives, data analysis and project report writing. It has been the highlight of the year for both Jerry and myself, ever since it started, and this enthusiasm is shared by students that have visited Norway, with many flagging it as the highlight of their degree and a huge help in preparing them for final year research projects.

This year's trip to Norway (July 10-17th) was set to be special as COVID had caused such a hiatus. The scene was set (or so we thought) for other staff to join up as part of the teaching team this year: Florian Busch, Megan McDonald, Leanne Taylor-Smith and a postdoc in the Hayward lab, Monica Aquilino. Alas, COVID struck again to scupper these plans with myself, Flo and Megan having to withdraw at the last minute. That left Jerry, Leanne and Monica to steer the ship. The outbound journey to Norway was not without some drama, thanks to the general chaos that currently depicts UK airports, but with the help of the "what 3 words" app everyone found each other and boarded the plane on time, arriving as planned at the Finse field station on the evening of July 10th.

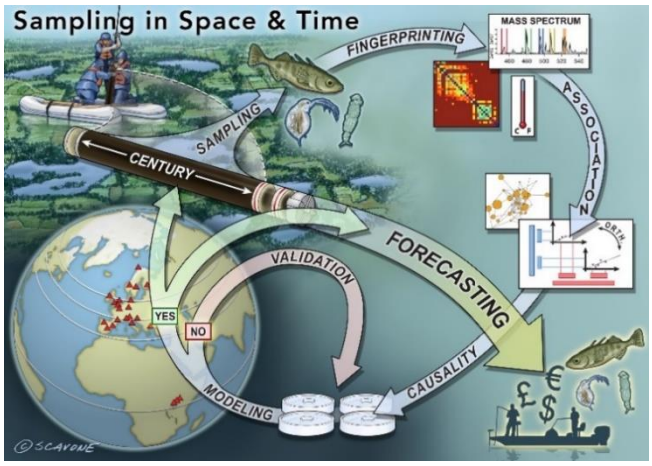
Despite all of the ongoing challenges of COVID and travel disruptions this year, Jerry, Leanne and Monica did an amazing job in not only ensuring this trip could go ahead, but also in covering the full scope of teaching within the field course module, as well as looking after any poorly students while out in Norway. A special thank you is also needed for our professional services team, specifically Leah Thompson and Claire Cooper who helped get all the travel arrangements sorted in time (just!). This was no small task given the multiple changes that took place ahead of the trip in combination with a change of travel agents this year. Hopefully, next year, the process will be a lot less stressful, but the rewards for those who travel to Norway equally great.

Recent success in BEC theme related to the 3Rs

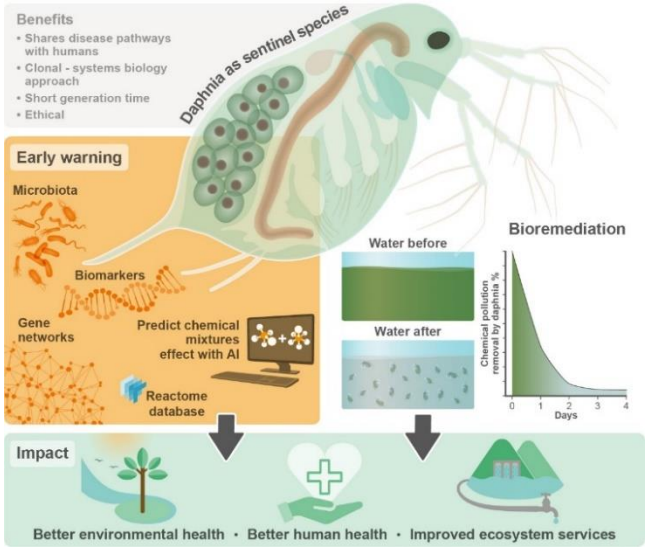
Jacob Collins from Mark Viant's lab won first prize in the annual Unilever Safety and Assurance Centre (SEAC) PhD Award for Science Communication. The prize was awarded for the creation of a clear, engaging and impactful communication piece for a non-target audience. Jacob's video focussed on the effect of chemicals on the environment and how toxicokinetic modelling can help to predict their potential impacts without the need for further animal testing. This award demonstrates the potential application of the theme's research outputs when applied to "real world" situations, in this case reducing animal usage in experimentation.

Get to know Luisa Orsini, newly promoted as Professor of Evolutionary Systems Biology and Environmental Omics

Luisa writes: My mission is to improve environmental health by pushing the boundaries of research and innovation. I apply high-throughput sequencing technologies and artificial intelligence to understand the impact of environmental change on freshwater ecosystems. I work with "ghost" DNA (see Sampling in Space & Time) and resurrected crustaceans (Daphnia, see below) to identify the causes of biodiversity loss and the mechanisms of evolution by which species persist in the face of environmental change.



The Time Machine framework (see left) uses sedimentary archives from watersheds to establish causal links between abiotic change and systemic loss of biodiversity, ecosystem functions and services (Eastwood et al, 2022, *Trends in Ecology and Evolution*).

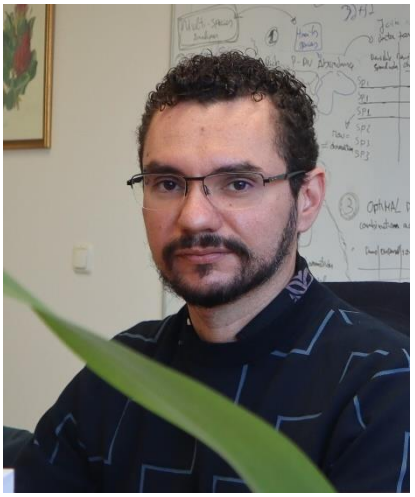


Daphnia as an early warning and remedial system. Chemical pollution damages human and ecosystem health (see right). The proposed framework broadens the use of the sentinel species *Daphnia* as a diagnostic and bioremediation agent of water pollution (Abdullahi *et al*, in press, *Environmental Science and Technology*).

I love multidisciplinary science, and thinking out of the box. This led me to patent and commercialise a water reclamation and waste valorisation technology that meets the net-zero carbon emission goals and delivers clean water for all. Daphne Water Solution Ltd (www.dwsol.co.uk) is a limited company that I co-founded in November 2021 to commercialise a green, sustainable and scalable water and wastewater bioremediation technology. It stems from my fundamental research on the sentinel species *Daphnia* and capitalises on its unique biological properties.

My journey to translating cutting-edge discovery science into R&D and real-world applications gave me the privilege to work with talented colleagues from diverse disciplines, including engineering, mathematics and law. It also provided me with the unique opportunity to co-develop solutions with regulators, SMEs and large enterprises, such as national and international water companies. My research and innovation are spearheaded by brilliant young minds that I have the honour to supervise. My PhD students and postdocs are my pride and motivation to contribute to a better future. By translating cutting-edge multidisciplinary science into practical applications, I provide tools and processes for mitigation interventions that enable green growth and meet UN developmental goals. My ambition is to deliver clean water for all with zero pollution, for a toxic-free environment, leaving a legacy of my research and innovation.

Introducing newly-appointed Juliano Sarmento Cabral



Juliano writes: After travelling, with heavy luggage, by train across Germany, Belgium, France and the UK, I finally arrived in Birmingham in late August to start my new appointment as Associate Professor for Biodiversity Modelling and Environmental Change on 1st September 2022. I am now based on the first floor of the Biosciences building (N107). Working with ecology and evolution across scales, my lab will serve as a cross-school bridge between Biosciences and GEES. The University's reputation, the opportunity to develop a truly cross-school interdisciplinary lab, the new study programme in environmental change, and already-active collaborations, were the positive points on my decision to leave the University of Würzburg for the University of Birmingham.

Originally from Campina Grande, Paraíba State (the eastern-most point of America), Brazil, I studied biological science at bachelor level at the Federal Rural University of Pernambuco, Recife, Brazil, from 2001 to 2005 (yes, a bachelor's in Brazil requires 5 years of study and a bachelor thesis defence). During my undergrad studies, I researched a range of topics, from owl diet to orchid cytogenetics and evolution. I also spent one exchange semester (spring 2004) at Iowa State University in the USA, working on plant invasive species. Back in Brazil, my bachelor thesis focussed on epiphyte (non-parasitic plants that grow on trees) ecology under environmental change.

I went from lab cytogeneticist and field ecologist in Brazil/USA to simulation modeller in Germany, where I did my PhD studies at the University of Potsdam, from 2006 to 2010 (after a six-months intensive German language course). For my PhD, I developed models that simulate the spatiotemporal dynamics of range distribution of South African protea shrubs. With these models, I assessed what effect wildflower harvest, loss of habitat, and climate change may have on the survival of species. During my PhD, I also had the opportunity to work in Cape Town, South Africa, and visit the study sites around the Cape Floristic Province. After my PhD, I continued simulating biodiversity dynamics in a series of postdoc positions between 2010 and 2016 at the University of Göttingen and in the German Center for Integrative Biodiversity Research (iDiv), ranging from the 3D ecophysiological and demographic dynamics of forests and their epiphytes to the eco-evolutionary dynamics of plant communities in oceanic islands.

In 2016, I was appointed as a junior professor in Ecosystem Modelling (EcoMod), at the Center for Computational and Theoretical Biology (CCTB), at the University of Würzburg, Germany, where I stayed until coming to UoB. At the CCTB, I led the EcoMod group, investigating a range of biodiversity topics, from the dynamics of individuals at the very local scale, up to communities and networks of communities across deep time and evolutionary time scales. Previous and ongoing projects targeted terrestrial and aquatic plants as well terrestrial invertebrates and birds.

What do all of these topics have in common? Biodiversity! My major interest is to unravel the mechanisms responsible for the beautiful diversity of life in our planet, which right now is in extreme danger of disappearing. I established over all these years a solid interdisciplinary research agenda, involving biology, geography and computation science, to tackle current environmental and biodiversity crises. With this task on hand, and with collaboration opportunities at UoB, the possibilities to contribute solutions to these crises are plentiful! Please, join me in this endeavour!

Precision Toxicology

Frankie Lloyd writes: Our society depends on a healthy environment. But tens of thousands of widely-used chemicals are polluting the environment, harming ecosystems, and depleting natural resources. The direct effects on human health for most of these substances are largely unknown. Yet over 9 million people die prematurely from exposure to chemical pollutants, which is three times as many annual deaths as AIDS, tuberculosis, and malaria combined. This pollution comes from many sources, contaminates different environments, and causes dire health problems, disproportionately affecting the poor. These poor populations often become stuck in a downward spiral of poverty and inequality due to this additional burden, often in violation of their human rights. Because of its complexity, this problem is often seen as intractable, yet the time has come when science and technology can provide solutions that were previously unimaginable…..

Precision Toxicology is an emerging approach to health protection and environmental justice that establishes links between chemicals and their adverse health effects, and between polluters and the victims of pollution. It is part of a data revolution that is speeding up the evaluation of hazards posed by polluting substances, thereby informing new policies and chemical safety legislation, for both environmental and public health management. Precision Toxicology

exploits DNA sequencing, mass spectroscopy, and computational science to obtain mechanistic understanding of how chemicals disrupt key biological and ecological processes that are shared among most animals, including humans, due to common metabolic pathways, encoded within our genes, and inherited by evolutionary descent.

In collaboration with environmental legal experts in the Birmingham Law School, our researchers are exploring ways to work with governments, regulatory agencies, industry, and the public. To move away from the slow, costly, and unethical uses of mammalian species for chemical safety testing, we favour the use of model species like *Daphnia* (water flea, see figure), *Drosophila* (fruit fly) and zebra fish embryos that are both sentinels of environmental hazards, and surrogates for understanding chemical risks to human health. Our mechanistic understanding of toxicity based on biomolecular signatures of the pathways leading to harm can be used to better manage risk. It will help achieve environmental justice by pin-pointing causal links and targets for effective interventions to protect people's lives.

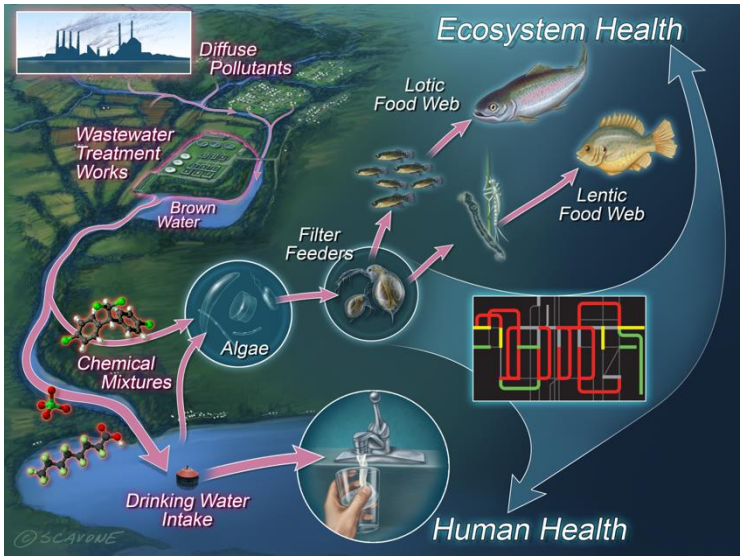


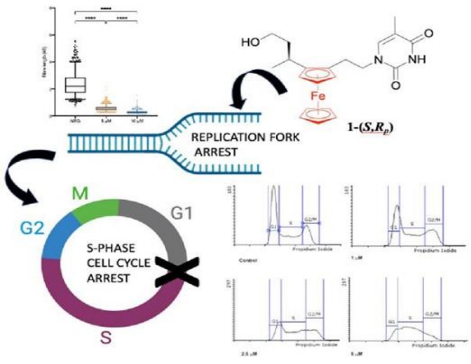
Figure: illustrating the modern use of the 'sentinel' species Daphnia for the protection of human and environmental health, by measuring the biomolecular signatures of toxicity in Daphnia's response to harmful chemicals.

Join Team Birmingham in our fight against harmful chemicals by contacting Frankie Lloyd (f.lloyd@bham.ac.uk) to be added to our mailing list. Students are especially welcome.

Heavy Metal - novel ferronucleosides with anti cancer activity

The editor writes: As well as being a centre for the new toxicogenomic science, the School has a long and excellent record in traditional Toxicology, and, for over 50 years, has hosted a very successful Toxicology MSc Programme. Here, Nik Hodges, the lead for this programme, tells us about his work with DNA-damaging reagents.

Nik writes: Metal complexes such as cisplatin have a successful history as anticancer agents, since their discovery over half a century ago. However, major challenges exist, including the emergence of chemoresistance that, in many, cases reduces patient outcome. Nucleoside and base analogues such as gemcitabine and 5-fluorouracil have widespread applications as anticancer agents, and function, following phosphorylation, by inhibition of DNA replication. Because of their success, there have been renewed efforts to find new metal-based nucleoside analogues with anticancer activity. One especially promising direction concerns compounds based on ferrocene, an iron-containing metal complex. For example, ferrocifen, a structural analogue of the widely-used estrogen receptor antagonist breast cancer drug, tamoxifen, has already entered clinical trials.

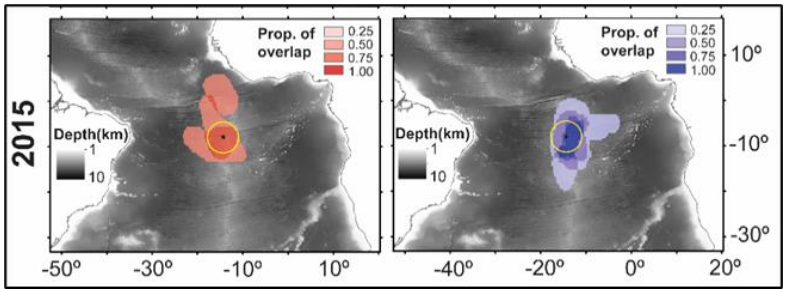


In collaboration with Professor Jim Tucker in the School of Chemistry, and Dr Isolda Canelon (School of Pharmacy), the Hodges lab has developed and tested a novel series of ferrocene nucleoside analogues with activity in cancer cell lines derived from the GI-tract. Work supported by MRC CIC and follow-on funding has identified 1-S,Rp as the most potent compound, to date, with cytotoxic activity *in vitro* comparable to cisplatin, in a panel of cancer cell lines that include gemcitabine-resistant pancreatic cancer cells. This is significant because pancreatic cancer is a disease with a very poor prognosis, and the frontline treatment, gemcitabine, is often ineffective and also has serious side effects in many patients that limit its clinical use. Mechanistic studies have identified a novel mode of action for 1-S,Rp that is distinct from existing clinically used nucleoside analogues. This involves inhibition of DNA replication without the need for substrate-level phosphorylation, and can be seen directly in cells by single molecule fibre fluorography. Studies with a non-redox active ruthenium analogue of 1-S,Rp have also identified a role for generation of intracellular reactive oxygen species in the mode of toxicity, and gene expression studies have confirmed replication fork stress. Recent studies funded by DIF and undertaken in collaboration with Sygnature Drug Discovery have begun to investigate the pharmacokinetic properties of 1-S,Rp. Initial results look promising, with good stability in blood plasma, and physico-chemical properties comparable to existing drugs already on the market. This paves the way to *in vivo* efficacy studies in animal models and subsequent translation into humans.

The tale behind the paper: Year-round movements of sooty terns (*Onychoprion fuscatus*) nesting within one of the Atlantic's largest marine protected areas

Reynolds *et al.* (2021) *Frontiers in Marine Science* **8**: 744506. https://doi.org/10.3389/fmars.2021.744506

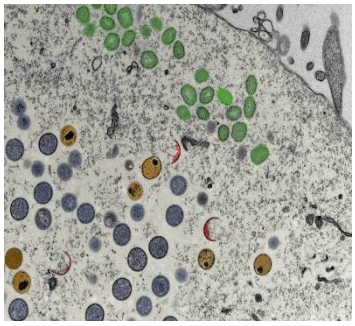
Jim Reynolds writes: Findings from this work contributed to the UK Government's 2019 designation of the 443,000 km^2 marine protected area (MPA) around Ascension Island in the mid-Atlantic. At the time, this was the largest MPA in the entire Atlantic. The study involved attaching tiny GLS tags, each about the size of a sugar lump, onto the legs of 90 breeding sooty terns. After retrieval, and downloading location data, analyses allowed us to understand how much of the MPA (i.e. the yellow circles in the figure panels with the island at their centres) this most pelagic of seabirds uses on migration. The paper documents extensive post-breeding migrations of both males (blue) and females (red), sometimes exceeding 50,000 km over 8 months. Birds appeared to spend most of their lives "on the wing" as demonstrated from "dry" signals from wet-dry sensors on the tags for >99% of registrations. Subsequent work in this colony of ~500,000 sooty terns has found that breeding birds restrict their movements to within the MPA, where commercial fishing activities have now been banned. Like many tropical seabirds, foraging sooty terns rely upon fish, such as tuna, that have now been overharvested. It is hoped that the MPA will result in a brighter future for all of Ascension's seabirds through restoration of tropical marine ecosystem function.



Note: *This paper highlights the value of long-term ecological studies that cannot be easily resourced from traditional funding programmes. sooty terns live for more than 40 years and so studies of their population biology must be undertaken over many decades before findings can inform conservation policy. This study was only possible because of baseline demographic data, collected since 1990, that informed us that predation pressure only partially explained the sooty tern's precipitous population decline of approx. 84% in just 65 years on the island. The missing piece of the puzzle was understanding their food restriction over many decades [see Global Change Biology* ***25****: 1383–1394 https://doi.org/10.1111/gcb.14560] and the fundamental role that foraging area protection afforded by an MPA will play in their population recovery*.

Update from Jason Mercer on Monkeypox 2022: The bad, the good and the ugly

The monkeypox virus is part of a larger poxvirus family which includes the smallpox virus, variola, and the vaccine virus used for its eradication. Endemic in Central and West Africa, monkeypox is primarily carried by rodents that, in rare instances, pass the infection to humans. In Africa, infection is associated with 1%-10% mortality - depending on the virus clade. The current outbreak of monkeypox, first detected in the UK, has climbed to over 57,000 confirmed cases, and 121 deaths in 119 countries around the world.



Our response to COVID taught us that knowing is half the battle. Providing rapid and accurate information to the public on how to identify a monkeypox infection, what to do if you are infected, and the level of risk this poses to the population has helped stem the spread of infection and misinformation. Taking lessons from the 20-year global smallpox eradication campaign, safe and effective vaccines have been distributed to those communities most at risk, and antiviral agents given in severe cases of disease. Current trends indicate that infections are now dropping in the UK, Europe and the US.

As seen with COVID, this outbreak has highlighted the disparity between developed and developing countries. Monkeypox diagnostic tests, vaccines and antiviral agents that are stockpiled in the US, UK, Canada and throughout Europe, are not available in the rest of the world. What COVID should have taught us is that allowing the large-scale circulation of monkeypox virus in humans sets the stage for adaptation, thereby increasing its endemic and pandemic potential. To squash this outbreak and prevent future ones, these important resources need to be made available to the countries that need them most.

Recognising Achievements in Education: Lindsey Compton explains professional advancement via the SFHEA

Are you an amazing teacher and wouldn't say no to a few more letters after your name? Then why not consider applying for fellowship through the Beacon Professional Recognition Scheme offered by HEFi and accredited by Advance HE? There are different fellowship categories depending on your level of experience and a fellowship category tool you can use to figure out the best level to apply for. Having been awarded Senior Fellowship of the Higher Education Academy (SFHEA) this summer, I have found it a great way to reflect on what I have done so far and plan out what comes next! If you want to find out more, HEFi provide fantastic support and I am happy to help out too!

MANY CONGRATULATIONS to Aneika Leney, Estrella Luna Diez & Carolina Rezaval on their promotion to Associate Professor



The Mini-Safe Mole

Andy Lovering writes: Dear readership – hope you are all well. This month saw a walkaround by the company that deals with several waste streams in the department. Prior to this, you may have noticed that myself and Ruth Perry made a pre-emptive check of the labs beforehand. I'm pleased to say that the inspection went well, and that compliancy was (in general) very good. There are a few issues remaining, and I'd like your help in dealing with these so that we remain fully compliant.

The biggest problem was related to the use of headphones, smartphones and earbuds – which was particularly prominent on some floors. This can result in contamination of those personal devices and the use of headphones/earbuds can also reduce situation awareness; all are to be avoided – communal radios are a better option. People were also opening doors with gloved hands, which is poor practice. The waste stream issues were mainly housekeeping problems – pipettes in yellow bags, discarded lab coats in the middle of labs, full yellow bags unsupported, placed on the floor. So….take pride in keeping clutter to a minimum (this was excellent during the inspection) and please please also ensure lab coat wearing in all lab areas.

Best, on behalf of the committee, Andy **STAY SAFE!**

Comings

Welcome to Laudina Amugi who writes: My current role in the School of Biosciences is Experimental Officer in Metabolomics at the Phenome Centre Birmingham, working on the H2020 PrecisionTox study and other metabolomics projects in toxicology and cancer. I graduated from the University of Leicester in 2013 with M.Chem Pharmaceutical Chemistry with a year in industry and went on to do my PhD in Analytical Bioscience at the University of Nottingham, Centre for Analytical Bioscience (CAB) supervised by Professor David Barrett. Sometime last year, I evaluated my career path, I knew I needed a change and a challenge after being in the same place for almost 9 years. I went on maternity leave in December last year, and this period was enjoyable and, most importantly, it gave me the time to reflect on my career and family life. I realised I wanted to do more and set myself apart, setting a good example for my children. By March this year I was convinced about my move and started looking for a job. I was looking around but, deep down, I can say I wasn't at all confident. A friend told me about the job in the Birmingham Phenome Centre, and I automatically thought there is no way I will get that job and work with Prof Mark Viant. I was encouraged to put in my application. I did so just hours from the application deadline, and I had no hope of being considered. When I received the email to attend the first round of interviews, I was stunned, but equally happy that I get to show what I am made of. I made it through the first round of interviews, and then had the chance to interview in person. I had an amazing day in Birmingham, meeting everyone at the Phenome Centre. At this point, my confidence level was 100%. I had started believing that I have good skills for this job and no matter the outcome, I will learn so much from this experience. After my in-person interview, I drove back to Nottingham, thinking throughout the drive about what I could have done better. The best bit was, I parked my car in the driveway and an email came through informally offering me the job. This was a Friday; hence it made the weekend exciting. Finally, I am making that change, and I am excited to be doing this at the internationally recognised metabolomics facility here in Birmingham. I officially started the new job in August, and I am thrilled to say that everything has exceeded my expectations. I am looking forward to working here and creating lifelong connections.

Welcome back to Dr Radwa Abdelwahab: Radwa, who is currently a Lecturer at Assiut Medical School in Egypt, rejoins us for a 6-month visiting fellowship, funded by the Egyptian Bureau for Cultural and Educational Affairs in London. Previously, whilst she was a PhD student in Assiut, Radwa spent nearly 2 years, working with Doug Browning and Steve Busby on the molecular biology of enteroaggregative *Escherichia coli*, so she is no stranger to Birmingham. The photo on the right shows Radwa at her PhD viva in March 2020.

More about The Steven Beech *Be Better* Award

Through the generosity of Steven's family and friends, the School offered two summer internships for Biosciences undergraduate students to obtain research lab experience through a project in one of the School's research groups. One of this summer's students, Ava Jordan, a Liberal Arts student with a growing passion for microbiology, joined Dr Jack Bryant to study antibiotic resistance in *Pseudomonas aeruginosa.* Ava successfully produced a mutant to study the link between starvation signalling and sulfamethoxazole sensitivity. Ava told us that "the project has enabled me to develop new skills and given me experience that will be invaluable for my future as a research scientist".

Congratulations to Professor Christine Foyer on being the 2022 winner of the American Society of Plant Biologists Charles F. Kettering Award for her many contributions to fundamental research on plant redox metabolism.

Hello from the College Research Support Office!

The Research Support Office (RSO) is here to provide support to those of you wanting to secure funding for your research. Jasmine Penny is the dedicated Research Facilitator for the School of Biosciences, and she can help with all aspects of preparing an application for funding, from developing and pitching the initial idea, to final checks and approvals.

L-R: Catherine, Chris, Jasmine, Phil and Danielle

Within the RSO we also have Christine Deacon (Research Finance Officer) who can provide expert advice on budgets! Danielle Cardon is the Facilitator for SERS, and Phil Jones and Chris Bradley have recently joined the team as the new Facilitators for Psychology and GEES, respectively. Catherine Frankland (acting Research Support Officer) and Judith Wood (Research Support Administrator) deal with funding searches and queries. They are the driving forces behind the comprehensive monthly research support bulletin. The team is headed up by our Research Development Manager, Helen Lowe, who is on hand to provide additional support for larger, more strategic applications. Both Helen and Judith are currently on maternity leave so we wish them all the best with their imminent arrivals!

The RSO is part of a wider support network (the Research and Knowledge Transfer Office (RKTO)) available to you for supporting your research funding journey. The RKTO incorporates PERCAT, DARO, Business Engagement and EU & International Research Support.

If you are interested in applying for funding, keep an eye out for our monthly bulletin and Jasmine's slot at the soon-to-be reinstated Biosciences Research Club. Please feel free to pop down and say hello to the team. We are based in Biosciences SG11 and SG12!

The EDI section: Confrontation

Mary Blanchard, School lead for People & Culture shares her personal reflections:

Equity for all often feels like an impossible goal, because working towards equity involves confrontation, not least within yourself. Confronting one's privilege is one of the hardest steps. As a white person, I have immense privileges. I have long known this, long accepted it, but wanted to change it. The colour of my skin, based on my ancestor's requirement for vitamin D in the darker continent of Europe, once they became static farmers, gives you no other information about me, other than the location of my ancestors around 6,000 years ago. Yet, globally, I have privilege for being white.

Recent events, with the death of our Monarch, have lit up Twitter with polarised opinions. Reality is rarely so polar, it lives in a messy middle ground, humans are more than one thing, but reality is tempered by privilege and quirks of birth. Equity, understanding, and moving forward involves confrontation. Immense, intense emotion has a root cause, and we all need to understand where our emotions come from, and learn to pause quietly, to be with them, to work through them, and to respond to them, rather than avoiding or reacting quickly to situations that trigger deep feelings within us.

My personal internal confrontation, the next step on my personal journey, is small, and it cannot change the world. But equity does not come from just one person. Equity within the School of Bioscience requires us *all* to take these steps, that we *all*, constantly and consistently confront our personal privilege (including towards gender identity, (dis)ability, our origins or who we love), and continue to challenge our understanding and our beliefs, whilst listening carefully to the others around us. And if we want an equitable School, as I hope we all do, this is not an optional process.

The 2022 Grace Frankland Lecture will be delivered by **Professor Sharon Peacock** CBE FMedSci of the University of Cambridge at 1 p.m. on **Tue 29 November**. Her title is *'Pathogen sequencing: time to shoot for the stars?'*. This lecture celebrates the memory of the pioneering microbiologist Grace Frankland (1858 – 1946), who worked at Birmingham University between 1894 and 1918.

Round and about

Friday 15th July was a BIG DAY for staff and students alike as scores of our students received their degrees. Biosciences had (again) been dealt the last ceremony of the day, so, in a departure from tradition, the School invited all to an informal afternoon party in the Quad before the ceremony. Happily, the sun shone, and it was a great occasion for staff, graduands and families and friends to meet up, as well as prizewinners, whose well-deserved awards were proclaimed by Neil and Julia. Big thanks to the School's brilliant behind-the-scenes team for setting up such a great event

The Prizewinners	
Farmer Prize for the best result in BSc Biological Sciences	***Kiara Frizelle***
John Humphreys Memorial Prize in Plant Biology	***Angeliki Pantziear***
John L Jinks Memorial Prize for Genetics	***Amy Taylor***
Medawar Prize in Human Biology	***Olivia Ayyamala***
Perry Prize for Biochemistry	***Emily Walker***
AJ Menzies Prize for Animal Biology	***Sophie Perry***
Head of School's Award (Biosciences) - Professional Placement	***Ben Arkle***
Head of School's Award (Biosciences) - University Pathway	***Daisy Marshall***
Biochemical Society Undergraduate Recognition Award	***Cameron Smith***
RSB Top student	***Samuel Madge***
Advanced Accreditation Top Project Award	***Gabrielle Clarke***

Keep in touch at regular Biosciences events:

Morning coffee & cake in the Undercroft: monthly from 10-11 am. Next sessions: Thur 6th October, Tue 1st November & Thur 1st December

Biosciences Research Club: on ice for the moment

IMI Lunchtime seminars: most Tuesdays at 1 pm

Biosciences Lunchtime seminars: many Thursdays at 1 pm

Welcome back for the Class of '70

On Friday 10th September, we welcomed the return of Birmingham Biological Sciences graduates celebrating 50 years of graduation. The event had been planned back in 2020, but COVID had other ideas, so 2 years late, they came for a tour of the School and afternoon tea, followed by a presentation of what's new by Chris Bunce (photos on the left). Saturday saw more meetings, capped by a gala dinner at the Botanical Gardens, when a special cake was cut to mark the occasion (photo, right)

PERCAT

Postdoctoral and Early Researcher Career Development and Training: updates for Biosciences

What is PERCAT? The PERCAT programme within the Colleges of Engineering and Physical Sciences and Life and Environmental Sciences provides a gateway to resources and support available for career development and training for postdoctoral and early career researchers. PERCAT is run by postdocs for postdocs and provides a programme of events and activities for staff in the two Colleges.

See: https://www.birmingham.ac.uk/university/colleges/les/percat/index.aspx

FEATURE: Where are they now?

Scores of staff and hundreds of students have passed through the School and gone on to do great things. Here Laura Machesky (pictured, left) tells her story: I joined the School of Biosciences in Birmingham in 1999 as an MRC Career Development Fellow. Birmingham was the place that I started my independent lab, so it was super exciting to be shown new lab space on the 8th floor of the Biosciences building together with my husband Robert Insall, also an MRC fellow. Our challenge was to set up a couple of vibrant research groups studying cell migration and signaling to cytoskeletal dynamics. It was the perfect time for this research, as Alan Hall's group and a few others around the world had just opened up the field of Rho family small GTPases as molecular switches controlling cell motility and signaling. Rho-family proteins are related to the most well-known cancer driver protein RAS, but they are special in that they connect with cell motility. The then Head of Department Ian Trayor, welcomed Robert and I and challenged us to "fill up the labs" with great students and postdocs, which I hope he would agree, we did. My lab grew in size and our interests expanded to other topics, such as phagocytosis, host-pathogen interactions and cancer invasion, which were all also controlled in part by small GTPases and involved actin dynamics.

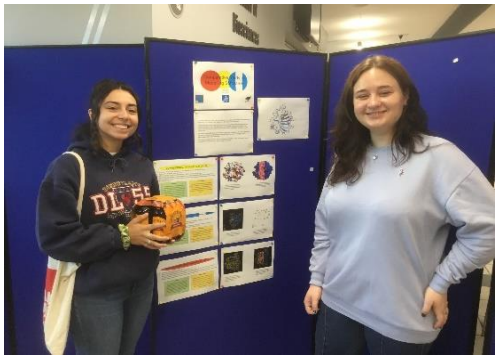
Attending a conference at the Cancer Research UK-funded Beatson Institute in Glasgow, I became very excited about the energy at this institute and the interest of many groups there in understanding the molecular mechanisms of cancer spread. I moved my group there in 2007, to take up a Senior Group Leader position, and I have focussed on the role of actin dynamics and small GTPases in cancer since then. For me, being mobile has always been an important part of keeping science fresh and exciting, so, after 15 years at the CRUK Beatson, I have accepted election to the Sir William Dunn Chair of Biochemistry at the University of Cambridge. This new appointment starts in November 2022, and will be the beginning of a new chapter of what I hope will be not only exciting research, but engagement with early career scientists and students to help train the next generation.

The Editor adds: The Cambridge University Sir William Dunn Chair of Biochemistry was established in 1914, and so was one of the earliest Biochemistry Professorial appointments. Laura will be the 7th holder of this position, and is the first woman to be appointed. The very first appointee was Sir Frederick Gowland Hopkins, who occupied the position from 1914-1942. He won a Nobel Prize in 1929, and is often referred to as the 'Father of British Biochemistry".

The Back Page

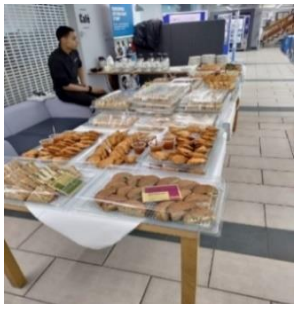
Forthcoming "Training" Events		*Registration*
12 Oct	Social Media Training for Researchers: Beginners	https://www.eventbrite.co.uk/e/397082764237
19 Oct	Social Media Training for Researchers: Advanced	https://www.eventbrite.co.uk/e/397089785237
19 Oct	Research Storytelling training	https://www.eventbrite.co.uk/e/research-storytelling-training-tickets-410389304457
3 Nov	Influential Researcher Session #1	https://www.eventbrite.com/e/influential-researcher-curate-your-online-publication-profile-tickets-411151514247

The Master's apprentice: Once again, our incoming MSc and MRes students presented a poster on a topic of their choice, as part of welcome week activities. Posters were displayed in the Undercroft, and prizes awarded for the best science, the best visual impression, and the best engagement with viewers. Below, MSc Molecular Biotechnology student, Georgina Rose, and Erasmus student, Letzia Bucchi, show off their poster, about molecular modelling software, that won the "engagement" prize.



Who's Who in the School of Biosciences team:

Head of School: Rob Jackson (also BIFoR representative)
Deputy Head of School: Klaus Futterer (lead: finance & placements)
Deputy Head of School: Helen Cooper (lead: estates & technology)
Head of Operations: Claire Cooper (no relation to the above)
Head of Education: Julia Myatt
Head of Research: Chris Bunce
Head of Knowledge Transfer: Tim Dafforn



***Summer Caption Competition Result**: "Sadly the delivery man had not been told that the Undercroft Café was now closed". Well done, RJ Miller!*

The Editor adds: lamentably, this is true, so the nearest port-of-call for coffee is now in the Collaborative Teaching Lab!

September brought the **Conference Season** to campus with the University Research Conference on the 22nd (below left) and the Molecular Microbiology Conference on 15th & 16th (below right), among many others.

Future Issues of the Mole

End of 2022: Focus on Education

April 2023: Focus on Plant Science

***Autumn caption competition:** what is being said here, maybe to Old Joe, so high up? Please send suggestions to the Editor*

THE LAST WORD: a BIG welcome to all our new undergraduate & postgraduate students. Join in, enjoy & learn!