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"Beginnings and endings" issue!

Editorial by Laura Green
*Head of the College
of Life & Environmental Sciences*



Roll out the old, roll in the new? I hope everyone is very proud of the way the semester has run. It has been wonderful to see the campus open and brimming with cheerful sounds of students and staff. I have had mixed success in recognising twinkling eyes above a mask, but keep twinkling! I have enjoyed seeing the School's activities around community building, with coffee mornings and competitions – informal meetings are a great time to get to know people and develop great ideas around research, education and outreach! I look forward to hearing of great things.

This month, it is time to get organised, finish those grants / papers / teaching materials and plan to stop for a few days around Christmas and the New Year. We are very lucky to get this time to step away from our University and spend time with family and friends – or a good book or film if you prefer. Whilst we cannot all have the life of Nebuchadnezzar, tucked up in the shed with his teddy bear until spring (as below), please make the most of the break to gather your thoughts and energy for 2022.

It would be disingenuous not to reflect on Covid and the uncertainty that continues at work and in our home lives. We do not know what omicron might bring, but we do know we have managed before, and I firmly believe we will manage again, and we are continuing to move forward step by step. I'm also sure you will join with me wishing a full recovery to all those who have been unwell.

I wish you, and all your friends and family, a very happy Christmas and New Year.



The Editor adds: for this year's final edition, the Mole dwells on looking forward and looking back, as we think about beginnings and endings. This issue clearly lacks the glitz and gut-bursting mirth of last December's 2020 Merry MegaMole, but, nevertheless, it is a "special bumper edition", with plenty to inform and entertain you, including coverage of the BioCup, BioSoc, and PERCAT, as well as some great science. During the year, several academic staff, including Michael Baker, Liz Ballou, Philippa Borrill, Rick Dunn, John Heath and Peter Winn, have moved on to new pastures, and so there are some fresh faces in the School (albeit hidden beneath the masks), and some of these are profiled. This time, we have only brief reports from the research themes, but (don't panic) there is loads of news, and, in 2022, we will run some theme-focussed issues of the Mole, starting with Microbiology towards Easter, followed by a Structural and Molecular Cell Biology extravaganza in June/July. Remember too, if you can't get enough of the Mole here, there is a link on the School Intranet pages where many of the past issues, dating right back to 2006, can be found: <https://intranet.birmingham.ac.uk/les/biosciences/newsletter/index.aspx>

Emeritus Professor Derek A. Smith

Professor Chris Thomas writes: Former Head of the Department of Genetics, Derek Smith, has died at the age of 93. He is remembered with great fondness and respect by colleagues and former students. The photo shows him (on the right) with Nobel Prize winner Paul Nurse (centre), who he taught as an undergraduate, and colleague, Jim Croft, a



fungal geneticist. Derek came to Birmingham in the 1950s, after postdoctoral research at the Cold Spring Harbor Laboratory on Long Island in the USA and then a stint at Porton Down. First, he joined the Microbiology Department under David Catcheside, but, in the mid-1960s, transferred to the Genetics Department of Kenneth Mather and John Jinks. The initial focus of his research was the genetics of amino acid biosynthesis in *Salmonella typhimurium*, but, by the time I joined the Genetics Department in 1980, the emphasis had changed to understanding spore germination in *Bacillus subtilis*.

In 1973/4 Derek took a sabbatical with the Open University to help develop genetics and microbiology teaching material. He was also very involved with the Society for General Microbiology (the SGM: now the

Microbiology Society), and was Editor-in-Chief of the Journal of General Microbiology from 1980-1985. During the 1980s, he chaired the University Biotechnology Management Group, and was responsible for appointing Chris Franklin and Steve Busby (as well as Andrew Lydiatt and Neil Thomas in Chemical Engineering) to their posts in 1983. He became Professor and Head of the Genetics Department after the untimely death of John Jinks in 1987.

Derek retired from employment in 1993 and moved out to Bewdley in Worcestershire. He had a very active retirement, and his son-in-law, Ferenc Mueller (our colleague from the Medical School) testifies to him retaining his sharp intellect right to the end.

I remember Derek as an excellent colleague and mentor. He introduced me to the skills of undergraduate lecturing and project supervision. I remember that he used to cycle to work across Canon Hill Park from Moseley, and always seemed to have an excellent packed lunch, including homemade cake. We used to run the second year bacterial genetics practical classes and third year projects together in S101. Our joint journal clubs, which included Jeff Cole's group, were very instrumental in my development. Later, we shared S104 as a research lab, and the students and post-docs in the two groups were very close. When Nigel Brown came to Birmingham in 1988, he found Derek to be a great help in understanding the "arcane processes of the University", and when Nigel became head of the new School of Biological Sciences, incorporating the Departments of both Genetics and Microbiology, Derek could always be relied on for sound and impartial advice.

Derek's former students and postdocs are glowing in their praise. Former PhD student Keith Chater, who spent his career at the John Innes Centre in Norwich, and had his career path set in motion by the Year 3 course in bacterial genetics given by Derek in 1965, remembers him as a fabulously conscientious teacher, interested equally in his subject and his students. As a PhD supervisor, Keith remembers that "he left me to get on with it, with only an occasional meeting to go through recent results and the next experiments." Anne Moir, who is now an Emeritus Professor at the University of Sheffield, and was Derek's senior post-doc and right-hand person for much of the 1980s, said "Derek was an exceptional person; I was very lucky to work for and with him".

It is a very strange coincidence that, in the week that our microbiologists held the annual lecture to commemorate Harry Smith (1921-2011), who succeeded David Catcheside as Head of the Microbiology Department, we hear of the passing of another Smith, who also contributed very significantly to the development of Microbiology at Birmingham.

The mini-Safe Mole



Professor Andy Lovering writes: Merry Xmas from all of us here at Health & Safety – this is being written at a time of changes in government restrictions, and the associated uncertainty around Omicron. What we can say is that it would benefit us all to remain vigilant about mask wearing and to continue at home lateral flow testing (a bi-weekly basis seems reasonable) if coming onto campus. Please monitor your inbox for further University guidance over the festive season. Lastly, a big thank you to all of you for your part in ensuring safe working practices in the School over the past 12 months. **STAY SAFE!**

Events: how it WAS beginning to look a lot like..... normal !!! (Editor adds: apology to Bing)



Students milling around the campus, face-to-face lectures, queues for coffee; on the left, M.Sc. student Chengyu Hu makes a point during a student presentation. On the right, the December graduation ceremony, addressed by our inspirational Chancellor, Lord Karan Bilimoria, with Amritpal Singh Bhara, an M.Sc. Microbiology and Infection student, who had graduated only moments earlier, addressing the assembly on behalf of the students.



At the ceremony, speaking of COVID, the Chancellor quoted Churchill: "When you are going through hell keep going"

Another of his reflections: "Live like today is the last day of your life: learn as if you are going to live forever"



NEW VENTURE: the BioCup

Mike Tomlinson explains: the BioCup is a new initiative, in collaboration with BioSoc, to encourage interaction between members of the School, especially students and academic staff. A range of non-too-serious competitive events are planned throughout the year. The two teams are Biochemistry and Biology. So pick your team! Points are awarded at each event – think *Hogwart's House Cup*! We are grateful to the College for their generous support for the BioCup. Here are reports on the first two events.

BIOCUP



Round 1: The Bake-Off (29th November)

Julia Lodge and Julia Myatt bagged 5 points each for the Biology team with their *Pseudomonas* and orangutan cakes, respectively. Rhiannon Moss won 5 points for Biochemistry for her moustache cake. Huge thanks to organiser Rhiannon Moss and her little helpers, David Hardy and Leah Thompson, and also everyone who took part in the judging and cake buying. The cake sale raised £143 for Movember and Mind charities.

Round 2: The Pub Quiz (30th November)

Students and staff packed the top floor of the Bristol Pear in an exciting evening of trivia organised by BioSoc. The questions were posed by Luke Alderwick, Chris Bunce, Leanne Taylor-Smith and Mike Tomlinson. Florian Busch and his team of 1st year Biochemists, team name *Biobebez*, won 5 points as top scoring team. The *Biobebez* were delighted to receive £80 in Amazon Vouchers. But Biology grabbed 10 points for best combined score, fending off Biochemistry by the narrowest of margins.

**JULIA LODGE
– MOST
INNOVATIVE
DESIGN**



**RHIANNON
MOSS –
HIGHEST
TECHNICAL
DETAIL**

**JULIA MYATT
– BEST
SELLER**



Hot off the tele-printer: latest BioCup standings: Biology 20 – Biochemistry 10

- Look out for more BioCup rounds next term, with prizes to win, and opportunities to represent your team!
- Keep up-to-date with the BioCup via School and BioSoc Instagram accounts: @uob_bio and @biosocuob



SEASONAL MATTERS

The Biosciences Annual Christmas Tree Decorating Event was a great success and we now have a sparkly tree in the Undercroft. Thanks to Claire Cooper and Jess Heaven for organising the decorating and refreshments. It seems that all who attended, enjoyed the festivities on 3rd December, with a few more events coming up too. Updates on the University's Covid-19 Omicron safety procedures will dictate if these can go ahead.



The festive season: Tree or not to Tree?

Who better to ask than Dr Kris Hart, operations manager for the Birmingham Institute of Forest Research?

With COP26 still “jingling” in our ears are you worried about getting a Christmas tree and your carbon footprint? Well, the debate to buy plastic or real has been raging for a few years, with both options offering benefits and drawbacks. Almost half of all Christmas trees bought in the UK and US have been plastic the last few years. The obvious advantage of plastic trees is the minimal mess, multi-year lifespan, and no creeping beasts making appearances. It is estimated that plastic trees pay back their carbon footprint after 5 years. If you choose a real tree, do not fear about deforestation, because almost all the trees sold in the UK come from farms and are treated as a “crop”. Once cut, they are immediately replaced with a seedling. The best advice, if you choose a real cut-tree, is to collect on your commute (easy if you have a vehicle of course, not a popular choice if you use a bike or train to work!). Maybe consider a young potted tree that can be kept outside for years to come, and reused (sometimes, they can even be rented and returned!). The best resting place for cut trees is to compost them, your local council may even run a service to collect them. But sending your tree to landfill (plastic or woody) is the very worst outcome; a standard-sized 2m woody tree will generate a carbon footprint of 16kg in a landfill, whereas simply burning it, or composting creates only a 3.5kg footprint. The plastic tree has a 40kg carbon footprint, so make sure you use it for as many years as possible. We hope this helps with your choice, or at least alleviates some of your carbon guilt.



Merry Christmas!



Tommy - President



Rebecca - Vice President



Ashwin - Secretary



James - Treasurer

BioSoc (and the BioCup)

BioSoc is THE society representing anyone, student or staff, interested in biology! We hold social events throughout the year, ranging from bar crawls to mini golf. This year marks the first official collaboration with the School of Biosciences through a series of events, the 'BioCup'. The BioCup involves students and lecturers, where Biochemistry and Biology go head-to-head to win points for their teams. Events so far have included a Bake Off and a Pub Quiz, and future events will likely include sports matches and a celebratory BBQ in the summer to announce the winner! Make sure you are following the BioSoc social media pages (see below) or contact Dr Mike Tomlinson who has been an integral part of making the BioCup a reality.

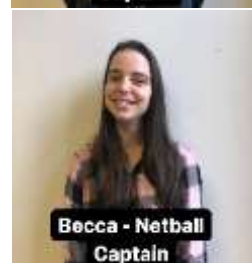
BioSoc also has netball, football and hockey teams that train weekly and play matches against other university societies. We also have a charity for the year, Mind, and events like the Bake Off help us raise money to donate. Our biggest event is the annual Easter Ball which, after two years of cancellations, will be held in late March 2022. The ball is a formal dinner-dance, open to anyone who manages to get a ticket before they sell out!

We look forward to seeing you at our future events!

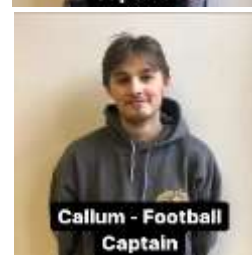
- for general enquiries contact the BioSoc email biosoc@guild.bham.ac.uk
- or contact President Tommy at txs919@student.bham.ac.uk
- for Easter Ball enquiries contact V-P Rebecca at rx958@student.bham.ac.uk
- or message our Social Media Pages @biosocuob



Niamh - Hockey Captain



Becca - Netball Captain



Callum - Football Captain

NEW ARRIVAL: Fayeon Fyfield-Calder, Research Project Manager

Fayeon writes about her role: I joined the School of Biosciences in September 2021, supporting the project coordination of a NERC-funded grant between five UK-India projects investigating Antimicrobial Resistance in the environment from Antimicrobial Manufacturing Waste. I carry out various project management and administrative tasks, including communication within and between teams, in order to provide, gather and compile project information and reports. I also communicate with other stakeholders, and organise and facilitate project events, meetings, and workshops. I am also responsible for programme management, ensuring timely delivery of milestones and tracking study progress with the various research teams. A key responsibility is liaising with the University's finance, research support and HR teams. I am looking forward to handling the project's social media accounts and contributing to the maintenance of the project website. I undertake this role on a part time basis and support other research projects across the University.



The Editor adds: Led by the IMI's Alan McNally, the SELECTAR project includes experts from the University of Leeds, Aligarh Muslim University, Panjab University, CSIR-Central Drug Research Institute in Lucknow, the Indian Institute of Technology (IIT) Delhi, and Jamia Millia Islamia University in Delhi.

Another new arrival: the appointment of Professor Teresa Carlomagno

Teresa writes: October 1st, 2021, 6:30 am finally, it is happening! I am boarding a plane bound for Birmingham, my new home. The past couple of months have been full of uncertainties. Not the best time for moving to the UK, shortly after Brexit and in the middle of a pandemic! But the kindness and helpfulness of everybody in Birmingham Biosciences makes me confident that everything will turn out good!

I am Teresa Carlomagno and have joined UoB as Professor in Integrative Structural Biology and Academic Lead of the national facility for biological Nuclear Magnetic Resonance spectroscopy based in the Henry Welcome Building (HWB-NMR, pictured below). My appointment is shared between Biosciences and the Institute of Cancer and Genetic Sciences in MDS; however, I am fully based in Biosciences on the 8th floor. Originally, I am Italian, but I am coming to Birmingham from Hannover in Germany, where I was Professor of Structural Chemistry. The excellent science, the outstanding NMR facility and, most importantly, the collaborative spirit at UoB, have made me decide to leave Germany, where I have spent most of my scientific life, and dare the step over the Channel.



A few words about my CV: I studied Chemistry in Naples, Italy, where I also did my PhD in 1996. After graduating, I joined the University of Frankfurt in Germany for a 3-year post-doctoral position, followed by a second post-doctoral stint in the USA at the Scripps Research Institute in La Jolla, California. From the US, I returned to Germany to start my own group at the Max Planck Institute of Biophysical Chemistry in Goettingen, where I was from 2002 to 2007. From 2007 to 2015, I was a group leader at the European Molecular Biology Laboratory in Heidelberg, and then became full professor at the University of Hannover.

I am fascinated by how molecules work together and want to discover the mechanisms by which they communicate with each other and perform chemical reactions. To do this, my group studies the structure and dynamics of molecules and their complexes, and most importantly how these structures change as a consequence of enzymatic catalysis, molecular recognition or environment. Currently, we study protein complexes involved in the regulation of gene expression and in protein homeostasis. Another of my passions is RNA, which, with its malleable structure, is most fascinating and challenging for a structural biologist. Here, I am interested in RNA-protein complexes involved in RNA chemical modification and in RNA riboswitches in infection. I think that RNA is a yet largely unexplored but important target in drug design. And lastly, following my physical chemistry training, I like to play with electromagnetic waves and develop new NMR methods.

But, most importantly, I believe in interdisciplinary methods and the power of integrative structural biology, and so I am looking forward to collaborations with the experts in X-ray crystallography, microscopy and mass spectrometry in Biosciences. My hope is that, together, we will build one of the strongest structural biology communities in the country and will have an exciting time unveiling more and more of nature's amazing secrets.

More information on HWB-NMR and its future mission will come in the June edition of the Mole!



Congratulations to Dr Mojgan Rabiey (pictured left) who has been elected, after a close contest, to be the next Education Secretary for the British Society for Plant Pathology. She will become a board member of BSPP and a trustee of the society, and will be responsible for the Education activities run by the society



Another (not so) new arrival: Dr Hung-Ji Tsai

Hung-Ji writes: My real journey in basic biological research started after finishing my bachelor's and master's degrees in Agricultural Chemistry and Microbiology at the National Taiwan University. At that time, I often foresaw myself working in the food industry, and juggling between the laboratory and fermentation tanks. After graduation, I joined the military, and temporarily left the life with textbooks and lab incubators. This allowed me to rethink deeply about what I can do, what I like, and what I wanted to do next. I made the decision, probably the best one ever, to pursue a research career. Then, I started my PhD studies at the University of Minnesota, USA, and studied how the yeast genome is organised in the nucleus during cell division. I also learned how to survive long winters and meanwhile filled my time with baseball and long walks in the park. Although I enjoyed being a PhD student so much, I eventually moved on and started my postdoctoral research studying genomic variations and adaptive evolution at the Johns Hopkins University. With the support from a 3-year Young Investigator Fellowship from the Prostate Cancer Foundation, I was able to explore how chromosomal instability alters cellular physiology, in both yeast and mammalian cells, independent of genomic variations. These discoveries became the foundation of my current research programme in Biosciences and IMI. My group, started in 2020, is particularly interested in how cells leverage large-scale genome instability to survive adverse environment, using systems biology approaches. It is a very exciting time of my life, while now I aim to turn my thoughts over the years into actions, as an independent scientist. However, one thing has never changed – it's all about fungi.



Jenny Dryden: retiring after a long "innings"

Jennifer (Jenny) Dryden has decided to retire after 39 years of great service to staff and students in the School.

Biosciences Operations Manager, Claire Cooper, writes: Jenny started her Technician role in Nov 1982 working in Central Services, supporting the School's research and teaching endeavours. She is a brilliant team player and will always go out of her way to help you. We will never forget Jenny's kindness, loyalty, her helpful nature, hard work and obviously her infectious laugh!

When it comes to fly food making, Jenny is the person to keep it going, one could say the expert in the school, so I hope she is passing on all those words of wisdom before she leaves!

Jenny, we are all sad to see you go, but you deserve a good rest and to spend quality time with your family. From everyone in the School of Biosciences, we would like to say a BIG thankyou for the many years of support you have given us, and we wish you the very best for the future.



Children in Need Fundraiser

Leah Thompson organised and successfully raised £128 worth of donations for the charity over November. In doing this, the competition 'Guess the tips in the jar?' was shared amongst staff and students via email to take part and the Winner of the £20 Amazon Voucher, with the closest guess of 999 was Michael Tomlinson; there were in fact 1339 tips in the jar in total. We hope to organise more Charitable incentives within the school throughout 2022 and further contribute to the community in exiting new ways.

Changing places: Doug Browning

On 1st January, Dr Doug Browning takes up a Lectureship at Aston University. Here he reflects on over two decades as a postdoctoral research fellow in the School.

Doug writes: Imagine the scene, played out a thousand times before. The newly qualified postdoc knocks on the illustrious professor's door.

"Come in!" is the booming response. Our hero tentatively opens the door, and enters the hallowed throne room. Sharp eyes look up, "Yes?"

"Hi Professor, I am your new postdoc." A beaming smile welcoming the sound of his recruit? Alas, no recognition. "I interviewed a couple of months ago?" he prods hopefully.

A quizzical stare. ".....ah.....yes. Good. Good to have you on board. Yes, yes. Hope all is going well?" Prof asks absent-mindedly. He tosses a coffee-stained document to our hero: "Here's the grant. Off you go" And that is it! The briefest of baton transfers in the relay race of science. They're off! This is where the journey begins. No safety net, like during the Ph. D. You're a postdoc now. A big boy. Your mission, should you accept it, to take the most flimsy ideas, hyped by bravado and bombast, and turn them into something so solid that not even the "third reviewer" can make mud stick (see <https://www.youtube.com/watch?v=-VRBWLpYCPY>). This is the role of the postdoc: magician, scientist, teacher and even nanny.



Get involved: make a difference!

To many, the role of the postdoc is seen as a stepping-stone appointment. But where to? Academia, industry, teaching, the dole? For a postdoc, it is a vocation, a passion. Dare we utter the word, a career? For 24 years that has been me. Perhaps going a different way from the norm, abundant soft money, with little security but with immense reward. That is the reason we stay at the coalface of science, honing our skills, though, one day, that may change because of the [Concordat](#). I joined UoB in 1997 (yes I am that old), first working with Steve Busby and Jeff Cole, and later on with Ian Henderson. I have experienced most roles that a postdoc can do, researcher, tutor, lecturer and countless more that I was told would be "good for my CV". I am a big believer in making things better, if you can, and so have more recently worked on postdoc committees such as [PERCAT](#), became co-chair of [UKRSA](#), and even edited the Mole with Philippa Borrill. Alas, my journey on the Good Ship UoB Biosciences comes to an end soon, as I take up

an academic position at Aston. Throughout my time at Birmingham, I have had the privilege of working with, and getting to know, many of you. Thank you to all of you for making my time fun and so rewarding, especially to Steve Busby, who always encouraged me to set my own course, and taught me the true meaning of scientific freedom.

So what have I learnt that may be of worth to the next generation of postdocs?

- 1) A watched autoclave never steams.
- 2) Never **EVER** say "this is the last time I will do this experiment". It will **NOT** be.
- 3) This is the best job you will ever have so enjoy it whilst it lasts, no matter how fleeting. Have **passion and pride** for what you do.
- 4) **Be positive** and always take opportunities when they arise. There is always light at the end of the tunnel. Sure, it may be HR with a flamethrower, but I've still got my own eyebrows and my hair fell out naturally!

Take care, sports fans. It has been a pleasure! TTFN. D.

Keep in touch at regular Biosciences events:

Coffee in the undercroft: first Tuesday of the month at 10 a.m.
(note, for Jan 2022, this will be on Tuesday the 11th.....hopefully)

Biosciences Research Club: last Friday of the month at 2 p.m.

IMI Lunchtime seminars: most Tuesdays at 1 p.m.

Biosciences Lunchtime seminars: most Thursdays at 1 p.m.



The PERCAT Page

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>

Meet your Biosciences PERCAT Reps

Sarah Lee Sarah is a Senior Research Fellow, currently working on the structure and function of membrane proteins. As well as being a PERCAT Rep for Biosciences, since 2017, she has been a member of UKRI BBSRC People and Talent Strategy Advisory Panel (PATSAP) researcher subgroup.

Santosh Kumar Santosh joined Biosciences as a Newton International Fellow, and continued as a BBSRC Research Fellow. His main interest is in developing a zebrafish infection model to study tuberculosis disease. Santosh is an active member of the PERCAT steering committee and various sub committees and is also the latest addition to the editorial board of the Mole.

PERCAT News

On 15th September, PERCAT welcomed the postdoctoral community back to campus with the **Late Summer Social** in the leafy setting of University Square. Postdocs from across LES and EPS came together to network and reconnect, enjoying the chance for face-to-face interaction after so long working in isolation and the opportunity to meet new people or reconnect with colleagues.



Future PERCAT Events and Activities:

The 3rd episode of the **PERCAT Port Postdoc podcast**, on the theme of “Clean Air: Transition to Net Zero” is at <https://www.birmingham.ac.uk/university/colleges/les/percat/port-postdoc.aspx>, featuring four researchers who are the winners of the Institute of Global Innovation (IGI) Clean Air competition.

Port Postdoc is a series of podcasts from the members of PERCAT, discussing research, global topics and engaging with postdoctoral matters, open to everyone. Follow our podcast series on twitter @PortPostdoc.

PERCAT Workshop Time for Research: How to Prioritise and Stop Procrastinating, Thursday 13th January 2022, 9.30–11.30am, Online. Learn how to prioritize, set goals and manage competing demands in order to spend high quality time on your research outputs.

EPS & LES PERCAT Career Development Competition 2021–22, closing date 12 noon on Friday 14th January 2022. Funding for individual or group career development activities for the postdoctoral and early career researcher community in EPS and LES via an annual open competition.

Remote Read and Write, every Friday, from 7th January 2021, 9.30am–3.15pm, Online. Work on your own writing, planning or literature discovery in a “virtual” but very supportive environment. Please sign up at mds.research.training@contacts.bham.ac.uk.

For further information on any PERCAT matter, contact Jennifer Thomson: j.l.thomson@bham.ac.uk, or your Reps.



All the 2s **SPECIAL EVENT**: Wednesday 2 February 2022 (16:30-17:30) in the Leonard Deacon Lecture Theatre at UoB Medical School

You are invited to attend the **INAUGURAL LECTURE** of Professor Alan McNally: 'Viruses to bacteria and back again: a scientific journey plagued by good fortune'.

Registration essential at:

<https://www.birmingham.ac.uk/university/colleges/mds/events/2022/02/alan-mcnally-registration.aspx>

Research News

(the Editor thanks Yun Fan, Jim Reynolds and many others for help to assemble this section)

Wellcome Trust Investigator Award to Alicia Hidalgo

Professor Alicia Hidalgo has recently been awarded £1.6 million from the Wellcome Trust to conduct her research project entitled "A molecular switch between structural brain plasticity and degeneration". This 5-year award is to investigate how experience shapes the brain. The brain is kept in balance between structural plasticity – its ability to undergo change – and homeostasis, constraining change within acceptable boundaries. Experience can have an impact in neural circuit structure, which can in turn lead to modifications of behaviour, in turn a source of experience. Perhaps these cycles enable adaptation to environmental change, and, over life, we each accumulate our repertoire of personal neural circuit modifications? Alicia and her team will investigate the molecular mechanisms driving these changes, and test the hypothesis that a molecular switch mechanism can drive generative versus degenerative cellular processes underlying brain change through life.



Chris Bunce's research leads to clinical trial funded by Blood Cancer UK

Research led by Professor Chris Bunce, together with colleagues Dr Farhat Khanim and Professor Mark Drayson, from the Medical School, has led to a new UK clinical trial, named REPAIR-MDS (Repurposed drugs to improve haematological responses in Myelodysplastic Syndrome), in patients with Myelodysplastic syndromes (MDS). MDS are a group of blood cancers that cause insufficient production of red blood cells, platelets and neutrophils (bone marrow failure). Besides being life threatening in their own right, MDS patients also carry a significant risk of transforming to an even more aggressive cancer called acute myeloid leukaemia (AML). REPAIR-MDS, which is funded by Blood Cancer UK, and was designed in consultation with MDS UK Patient Support Group, is the first randomised trial in the UK that seeks to test the ability of adding repurposed drugs to the current management regime in MDS patients. One randomisation in this trial is to use a triple drug combination of VBaP: Valproate (anti-convulsant), Bezafibrate (lipid lowering drug) and Provera (contraceptive steroid). This derives from the anti-cancer activity of VBaP and its effectiveness on improving blood cell production recently demonstrated by Chris and his team.



Zoo Time

Susannah Thorpe and Jackie Chappell and their Enclosure Design Tool (EDT) team have been working in partnership with orangutan rehabilitation centres and zoos to use knowledge about wild behavioural profiles to help their partners to create environments in which animals can express natural behavioural profiles, improving their physical and mental wellbeing. They have recently published a review in *American Journal of Primatology* (Chappell & Thorpe, 2021 <https://doi.org/10.1002/ajp.23328>) about the importance of this approach for orangutans in rehabilitation centres, while Jackie and her NERC CENTA PhD student Ricardo Lemos De Figueiredo have been working with Drayton Manor Park Zoo to develop a similar framework for parrots. As you can see from the photo, sometimes it is not very clear who is doing the behavioural observation!



Wolfson Advanced Glasshouses

The new Wolfson Advanced Glasshouses on campus at the University of Birmingham offer state-of-the-art facilities for accelerating research into a wide range of areas including sustainability and climate change. Professor Rob Jackson and Dr Mojgan Rabiey explain the importance of the facility and what it means for plant science and food security research in a video: <https://youtu.be/bYjQ6uMph-Q>. Additionally, you can “visit” the facility with this virtual tour: <https://www.birmingham.ac.uk/research/facilities/glasshouses/about.aspx>



One Health: protecting people, animals, plants and the planet

You may have noted a difference of perspective among people discussing the recent COP26 summit. While world leaders were concerned about the effects of climate change on human populations, activists’ viewpoints focussed more broadly on the effects on animals, plants, and ecosystems. These elements are – of course – all inter-connected, and actions against climate change will not succeed unless all are considered. The One Health paradigm takes a similar stance on protecting health: all of those who protect human, animal, and environmental health commit to working together to achieve the best outcome for the planet and its inhabitants.



credit: CDC <https://www.cdc.gov/onehealth/index.html>

Members of the Biosciences Biosystems and Environmental Change theme are making progress under this broad umbrella of One Health. Steve Unwin and Ricko Jaya (an ARCUS Foundation PhD student, supervised by Susannah Thorpe and Jackie Chappell) recently published a paper (Sherman et al., 2021) in *Frontiers in Veterinary Science* in which they used disease risk analysis tools and the One Health paradigm to help to reduce the emerging risk of disease transmission between human and non-human animals. The focus of their paper is the implication for COVID-19 transmission posed by orangutan translocations, where there is close proximity between humans and orangutans, and where humans do not always use adequate PPE.

PPE use during wild-to-wild orangutan translocations. Taken from Sherman et al. 2021.



Tackling Toxicity

Frankie Lloyd (Project Officer for the Environment Care Consortium) introduces us to the University of Birmingham’s new Centre for Precision Toxicology.

With the pressing need for environmental solutions and remedies, the University of Birmingham is rising to the challenge with the formation of the Centre for Precision Toxicology. This centre combines experts and researchers from across the five colleges of the University to collaborate and share their ideas and research about environmental health, -omics and toxicology. Precision Toxicology is at the heart of the Centre’s research. This is a new, cost-effective testing paradigm for chemical safety assessment that revolutionises regulatory technology, replaces animal testing, reduces uncertainty, and determines safety



factors in assessing risks to human health. Precision Toxicology identifies molecular toxicity pathways and their associated biomarkers that are shared among organisms by evolutionary descent. The Centre will use these biomarkers (that are proven to be predictive of chemically induced adverse health effects) to design practices that will protect human health from the toxic effects of chemicals found in people's homes, food and the environment.



The main project in the Centre for Precision Toxicology is the €20 million PrecisionTox project, coordinated by John Colbourne. This ambitious transatlantic interdisciplinary project, funded by the European Union's Horizon 2020 research and innovation programme, brings together a network of 15 European and US organisations, led by the University of Birmingham. The aim is to better protect the health of people and the environment by establishing New Approach Methodologies for chemical safety testing, using a combination of genomics, metabolomics, evolutionary theory, quantitative genetics, technology and law. The project advances the field through three big concepts: phylogenetic toxicology, quantitative susceptibility and embedded translation. Research within PrecisionTox focuses on ethical biomedical model organisms such as fruit flies, water fleas, round worms and zebrafish, to uncover molecular toxicity pathways shared across the animal kingdom.

The Centre is also partnered with the Environment Care Consortium, for which, the University of Birmingham acts as its European hub. Through this, a collaborative team of over 100 science, legal and public health experts offers leadership in making the environment safe from chemicals, and defending people's rights to a healthful environment. The team at Environment Care are currently incorporating the Consortium, and becoming a charitable non-profit organisation that will fundraise to assist in the delivery of global action research projects within communities suffering the negative health consequences of pollution exposure. The mission of the Environment Care Foundation will be to improve the health of communities facing environmental injustices.



If you want to find out more about the amazing Centre for Precision Toxicology, visit our website at: <https://www.birmingham.ac.uk/research/centre-for-precision-toxicology/index.aspx>

To find out more about the PrecisionTox project, contact Project Manager Agata Ormanin (a.ormanin@bham.ac.uk) or visit the website at: <https://precisiontox.org>

To find out more about the Environment Care Consortium, please contact Project Officer Frankie Lloyd (f.lloyd@bham.ac.uk) or visit the website at: <https://www.environmentcareconsortium.or>

The tale behind the paper: the old trees seem to be doing oak-ay

A Gardner, DS Ellsworth, KY Crous, J Pritchard, AR MacKenzie (2021) Is photosynthetic enhancement sustained through three years of elevated CO₂ exposure in 175-year-old *Quercus robur*? *Tree Physiology* tpab090 <https://doi.org/10.1093/treephys/tpab090>



Anna Gardner, final year BIFoR PhD student, writes: It seems that old oaks don't appear to be slowing down their carbon uptake as they age. The terrestrial biosphere takes up around 30% of the CO₂ that's emitted into the atmosphere and temperate forests are key players. However, our current understanding of how northern temperate forests will respond to future rises in CO₂ are based on the responses of young plantation grown trees. In our paper we quantified the photosynthetic responses of old oaks and found the trees responded to the extra CO₂ without acclimating to their new high CO₂ world. Our results indicate that these trees will likely continue taking up carbon if soil nutrients are available. These data are the first piece of the jigsaw in calculating the carbon budget of this woodland and the first step in understanding the role of mature forests in our fight against climate change. *Despite the continuation of the Covid crisis, there may be some better news for the climate crisis – what a re-leaf!*



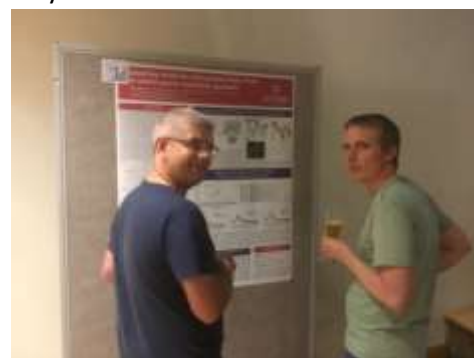
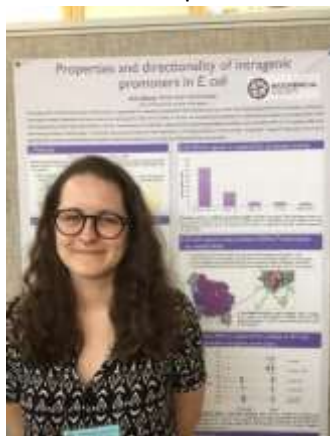
The tale behind the paper: new directions in transcription

EA Warman, D Forrest, T Guest, JR Haycocks, JT Wade, DC Grainger (2021) Widespread divergent transcription from bacterial and archaeal promoters is a consequence of DNA-sequence symmetry. *Nat Microbiol.* 6:746-756

Dave Grainger writes: sometimes in science you don't start out with a grand plan, but you follow your nose and the story finds you. The latter was certainly the case with this paper. I'll start back to 2009, when my lab was based in Warwick, and consisted of only me and a PhD student, Shivani Singh. Shivani had cloned a gene that interested us and the results were far from expected. Most notably, the gene (i.e. the actual DNA sequence, not an encoded product) behaved much like non-coding regulatory DNA: it could control the expression of other genes. In the years that followed, Shivani and a subsequent student, Lisa Lamberte, pulled on this "loose thread". It transpired that coding DNA in bacteria, particularly "out of place" DNA introduced by viruses, sometimes influences gene expression. Emily Warman, the first author of the current paper, picked up the story in 2017. Almost immediately she was stumped by another unexpected observation. The regulatory properties of DNA regions Shivani had identified were not

constrained by orientation in the genome. This contradicted everything we understood about the control of gene expression. Undeterred, Emily realised that we'd stumbled on a new type of regulatory DNA sequence common throughout the prokaryotic domain of life. The paper describes Emily's breakthrough.

The photo on the left shows Emily with her poster at the 2019 Prokaryotic Transcription Gordon Conference, and the photo on the right shows Dave Grainger with co-author Joe Wade, a former Biosciences PhD student, now an Assistant Professor at SUNY, Albany, USA.



Endnote from Julia Lodge who, shortly, will step down as Biosciences Head of Education



This will be the last time that I write in the Mole as Head of Education, so I want to use the opportunity to say a huge thankyou to all of my colleagues in Biosciences for their support during the last five and a half years. Education in Biosciences is a team effort and without a bunch of such fantastic colleagues from both professional services and academic staff, the experience would have been a lot less enjoyable.

I guess that this is the point where I should look back and think about what changes we have made during my tenure. Do you remember when we used to print stacks of handouts for every lecture and lug them over to the lecture theatre? I used to have to use a trolley for some of the large classes. From the point of view of sustainability, if from no other, it must be a good thing that we no longer do this. I am not going to

give you a long list of innovations and developments, but I will remind you of what is probably my most visible innovation. The introduction of the blue lab coats worn by teaching staff and PGATs in practical classes came about when Robin May turned up to teach a practical with me one day wearing a blue lab coat. I realised how helpful it was to be able to pick him out from the crowd of white lab coats. We trialled this with some cast-off blue lab coats from Robin's tissue culture facility, and this is now standard practice throughout the CTL.

I wish my successor all the best in this challenging but rewarding role, and I am sure that you all will give them the same support that you have given to me. I wish you all a restful break and a happy New Year.

The Editor adds: Julia took over as Biosciences Head of Education in 2016, when Jerry Pritchard stepped up to be Director of Education for the College. Since then, Julia, with her unique personal blend of carrot and stick, supported by hard work, her deep knowledge of "the system", good humour, and infinite patience, has guided the School's programmes through some turbulence, including reshaping the academic year, and, of course, the pandemic. Students and staff at all levels owe her big-time. She will be a very hard act to follow!

To Make You Smile (itma!)



Seasonal thought for all molecular biologists:



The Caption Competition

The prize for the best caption to the September Mole photo (right) goes to Chris Bunce with: "For goodness sake, don't go into the marquee before we fit the lightning conductor!". A keen eye for Health and Safety, Chris, most laudible!

For the final competition of 2021, we return to the Head of College's tortoise who appears to have attained an impossible achievement under the gaze of a canine friend! Recalling that its name is Nebuchadnezzar may or may not assist your reflections, but please send your wittiest efforts to the Editor.



Got a story for us? Want us to "hold the front page"?

Contact Steve Busby: s.j.w.busby@bham.ac.uk

Future issues of the Mole

- March 2022: focus on Microbiology (joint production with the IMI Newsletter)
- June 2022: focus on the Structural and Molecular Cell Biology research theme
- Sept 2022: focus on Biosystems and Environmental Change

