University of BRISTOL
Elizabeth Blackwell Institute for Health Research

20 years bristol neuroscience

# Bristol Neuroscience Newsletter

## 2023: Issue 2


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Inside this issue:

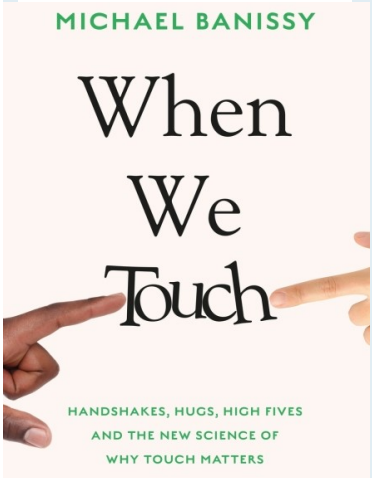


## Touch is essential to our wellbeing

From the moment we are born, touch is central to our development and wellbeing, yet we live in a world where relationships are increasingly remote and touchless.

Inspired by 'touch hunger' - a modern epidemic in our distanced world - Prof Michael Banissy (School of Psychological Science) has drawn on one of the world's largest studies across 112 countries to understand what touch means, how it impacts our wellness and why it is essential for healthy development.

*From exploring the role of touch in relationships and wellness to uncovering the neural mechanisms behind why caring touch feels good, research is increasingly staking up to show that touch matters. It has revealed the nuanced nature of our sense of touch and shed light on the importance of touch in our daily lives. We know that touch is something that affects us all – yet it is more powerful and complex than we might first think.*




Every day we use our sense of touch to navigate the world. A handshake, a pat on the shoulder, a hug – these are the essential touches that make up our daily lives. Banissy brings together diverse scientific insights with notable touch points in pop culture and personal experience to explore the role touch plays in our physical and digital lives. The book explains why touch is essential to our well-being, the role it plays in our relationships, friendships, in the bedroom, workplace, and in team activities such as sports.

The publication explores:

- Touch personalities
- Touch starvation
- How touch defines our relationships and self-esteem
- The impact of touch on our physical and mental health
- How to enhance supportive touch for a happier, healthier life

When we touch by Michael Banissy was published on 30 March 2023 by Orion Spring.

# EVENTS

**Working with Industry for Technical Specialists - Industry Engagement**
8 June 2023, 12.00 - 14.00, location TBC (UoB only)

**Space, time, speed and acceleration in the GPS circuits of the rodent brain,**
8 June 2023, 15.00 - 16.00, Dr Emilio Kropff (Instituto Leloir, Buenos Aires, Argentina), online

**Working with Industry for Technical Specialists - How to communicate with Industry**
9 June 2023, 10.00 - 12.00, online (UoB only)

**Launch webinar for BBSRC 2023 transformative research technologies (23TRT) call**
9 June 2023, 10.00 - 11.00, online

**Medical Education Research: Writing book chapters / editing books**
9 June 2023, 12.00 - 13.00, online (UoB only)

**Brains on Sleep**
9 June 2023, 12.00 - 13.00, online

**Compositionality in vector space models of meaning**
9 June 2023, 13.00 - 14.00, Martha Lewis (Department of Engineering Mathematics, University of Bristol), C44 Biomedical Sciences Building and online

**How can we meet growing 'same day' demand in primary care?**
12 June 2023, 12.30 - 13.30, Dr Matthew Booker (Centre for Academic Primary Care, University of Bristol), online

**Refining head fixation and fluid control in rodents across GW4**
14 June 2023, 10.00 - 13.00, University of Bristol

**Three Minute Thesis finals**
14 June 2023, 15.00 - 17.00, Priory Road Complex main lecture theatre

**Let's Talk Digital Conference 2023**
15 June 2023, 9.00 - 17.00, Park Campus, The Park, Gloucestershire University Hospital, Cheltenham GL50 2RH and online

**Memory Replay Conference: Replay @CUBRIC-2023**
15 – 16 June 2023, Hadyn Ellis Building, 52 Maindy Road, Cardiff CF24 4HQ

**Brain Research Needs Animal Models: Let's Talk About It!**
15 June 2023, 12.00 - 13.00, Christina Dalla (National and Kapodistrian University of Athens, Greece) and Roman Stilling (Tierversuche verstehen, Germany), online

**Understanding and Improving Model-Based Deep Reinforcement Learning**
15 June 2023, 13.00 - 14.00, Jessica Hamrick (Staff Research Scientist, DeepMind, London), online

**FULL EVENTS LISTINGS ARE AVILABLE ON THE BN WEBSITE**

# NEWS

## Mysterious underwater acoustic world of British ponds

Ponds are magnets for life and a lot of that life is very noisy. Bugs, fish, frogs, and aquatic plants all produce sound creating a diverse underwater orchestra that scientists are only just starting to understand.

To better understand these mysterious soundscapes, a team of researchers collected 840 hours of underwater sound recordings from five ponds in the southwest of England using an underwater microphone.

Using this acoustic method, the presence of species, and a determination of ecological health, can be inferred simply by listening to the natural world without disturbing the environment or harming the plants and animals within it. Typically, a nocturnal chorus is

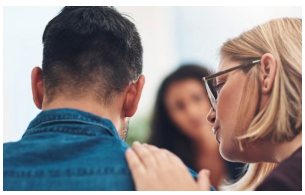
made by aquatic insects that compete to attract mates by producing scratching sounds as they rub their genitals against their abdomens. During the daytime, aquatic plants dominate with rhythmic whining and ticking sounds produced as tiny oxygen bubbles are released through respiration.

This research is the first to provide a detailed description of pond soundscapes in the UK and will help inform the acoustic monitoring of freshwater ecosystems to help prevent irreversible species loss due to climate change and habitat loss.

Greenhalgh JA, Genner MJ & Jones G (2023). Diel variation in insect-dominated temperate pond soundscapes and guidelines for survey design. *Freshwater Biology*.

## Identifying and managing those at risk of psychosis

Clinical guidelines about providing early support to patients with an at-risk mental state for psychosis might not be being met.



Researchers at the National Institute for Health and Care Research Bristol Biomedical Research Centre (BRC) and the Centre for Academic Primary Care (CAPC) identified high thresholds for accessing treatment and limited treatment availability as barriers to successful guideline implementation.

People with an at-risk mental state (ARMS) are seen as being at risk of developing psychosis because of some of the symptoms they may be experiencing. The National Institute for Health and Care Excellence (NICE) recommend that people with ARMS should be referred to Early Intervention (EI) teams or other specialised services for assessment and treatment. This is because intervening early can prevent psychosis from developing.

However, BRC's researchers found that referring or getting people assessed by an EI team is a complicated process. Overall findings suggested that many people who could potentially meet the threshold for ARMS are either not seen by EI teams or not being offered specialist treatment.

Strelchuk D *et al*. (2023). The identification and management of people with an at-risk mental state (ARMS) for psychosis in primary and secondary care services: A qualitative interview study. *Early Intervention in Psychiatry*.

## Combating the dangers of gambling with cryptocurrencies

A study has highlighted how cryptocurrency investors often suffer gambling-related harms – and online gambling outlets accepting cryptocurrency as wagers pose even greater risks.

The first-of-its-kind research, led by the Universities of Bristol and East London, urges for major reform to reduce the extra threat to online gamblers now being lured by an explosion of so-called 'cryptocasinos'.

The study explores the intersection of cryptocurrency investing and gambling, citing a growing body of evidence which demonstrates how cryptocurrency trading is strongly

associated with increased gambling activity and high-risk stock trading. For example, cryptocurrency investors display behaviours observed in gamblers, such as chasing losses and trading compulsively.

Cryptocasinos therefore present a double danger, as they allow gamblers to bet on a range of sophisticated online gambling products such as online slots and in-play sports bets, using cryptocurrencies as the source of funds.

Andrade M & Newall PWS (2023). Cryptocurrencies as Gamblified Financial Assets and Cryptocasinos: novel risks for a public health approach to gambling. *Risks*.

*Image © Raw Pixel*

## Gene in the brain can put brakes on anxiety

Anxiety disorders are common with 1 in 4 people diagnosed with a disorder at least once in their lifetime. Severe psychological trauma can trigger genetic, biochemical and morphological changes in neurons in the brain's amygdala, leading to the onset of anxiety disorders, including panic attacks and post-traumatic stress disorder.

The efficacy of currently available anti-anxiety drugs is low, with more than half of patients not achieving remission following treatment. Limited success in developing potent anxiolytic drugs is a result of our poor understanding of the neural circuits underlying anxiety and molecular events resulting in stress-related neuropsychiatric states.

In this study, the research team focused on miRNAs in animal models. These molecules, also found in humans, regulate multiple target proteins controlling the cellular processes in the amygdala. Following acute stress, they found an increased amount of one type of molecule called miR483-5p, and showed that increased miR483-5p suppressed the expression of another gene, Pgap2, which in turn drives changes to neuronal morphology in the brain and behaviour associated with anxiety. Together, the team found that miR-483-5p acts as a molecular brake that offsets stress-induced amygdala changes to promote anxiety relief. This is one step towards the discovery of novel treatment for anxiety disorders.

Mucha M *et al*. (2023). miR-483-5p offsets functional and behavioural effects of stress in male mice through synapse-targeted repression of Pgap2 in the basolateral amygdala. *Nature Communications*.

## Long-term use of steroids could impair memory

Glucocorticoids, commonly known as steroids, are the most commonly prescribed anti-inflammatory drug used to treat a range of conditions including allergies, asthma, arthritis and inflammatory bowel disease. However, they often have an adverse effect on mood, sleep and memory and many patients prescribed steroids report cognitive decline and memory impairment.

A multidisciplinary research team at the University of Bristol, led by Dr Becky Conway-Campbell (Bristol Medical School: Translational Health Sciences), wanted to examine the impact of steroid treatment on memory processes to find out if the reported adverse effects were a result of the steroid or the underlying medical condition.

Using a rodent model, the team found that even a relatively short course of prescribed steroids - methylprednisolone for five days – led to impaired memory performance when carrying out a memory and learning-related task.

An analysis of the rodent model brains indicated that the brain region important for memory and learning - the hippocampus - was significantly altered by the treatment. The functional activity of the hippocampus, measured by electrophysiological recordings, was profoundly impaired in the rodent model treated with methylprednisolone, providing the first evidence of a root cause for the memory deficit.

Birnie M *et al*. (2023). Circadian regulation of hippocampal function is disrupted with corticosteroid treatment. *PNAS*.

## Animals suppress personalities for group efficiency

Social animals should limit individuality to conform with the behaviour of the group, a study has found. A team in the School of Biological Sciences observed that group safety was improved when animals paid attention to the behaviours of each other. Their findings reveal that simple social behavioural rules can drive conformity behaviour in groups, eroding consistent behavioural differences shown by individual animals. The team modelled the behaviour of a small group of animals with differing tendencies while performing risky behaviours when travelling away from a safe home site towards a foraging site. They then compared this to their behaviour while completing the same activity in a group.

The group-aware individuals spent longer in the safe space and moved more quickly to the foraging spot, making the mission less dangerous.

*Experimental evidence for this comes from animals like the stickleback fish. We can measure the personality of individual fish when they are given a food-finding task on their own, and compare it to what happens when they are put in a group of mixed personalities and given the same task. When faced with a social task, we find that the fish tend to suppress their own behaviour, and instead conform with what other fish in the group are doing.*

Prof Christos Ioannou

Rand S & Ioannou C (2023). Personality variation is eroded by simple social behaviours in collective foragers. *PLoS Computational Biology*.

## Bringing the patient voice to the fore

The Universities of Bristol, Nottingham, and Birmingham were awarded a £2.6 million Wellcome Discovery Grant for a six-year project which will use philosophical expertise to help bring patient voices into healthcare research and practice.

Some patients have reported that their testimonies and perspectives are ignored, dismissed, or explained away by the healthcare profession. These experiences are classified by philosophers as 'epistemic injustices' because, in some cases, they are based on prejudice and can jeopardise patient care and undermine trust in healthcare staff and systems.

The project, called *Epistemic Injustice in Healthcare* [EPIC], will include case studies from across a range of illnesses, theoretical work, events, focus groups, the creation of a network with patients and health professionals, postdoctoral positions, summer schools, and publications. The project aims to identify practical measures for the benefit of patients and healthcare practitioners alike.

The Principal Investigator, Prof Havi Carel (pictured) from the University of Bristol's Department of Philosophy, is a philosopher of medicine and an expert on the experience of illness. The project will begin in September 2023.

Read the full University of Bristol news item

## Jean Golding Institute seedcorn awardees 2022-23

The University of Bristol's Jean Golding Institute offers seedcorn funding each year to support and promote activities that will foster interdisciplinary research in the area of data science. The latest funding call resulted in the following awards:

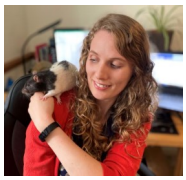
- Neo Poon (Bristol Medical School: Population Health Sciences); Neo's research focuses on the socioeconomic factors behind self-medication behaviours.
- Emmanouil Tranos (Geographical Sciences) is developing research frameworks and computational workflows to use the digital traces human and, more specifically, the economic activities left behind, to better understand cities, their structure, and economies. This is important, as such digital traces allow us to observe behaviours and phenomena and, consequently, answer research questions that traditional data sources have not allowed us to do.


- Jin Zheng (Engineering Mathematics) and her team will develop the first open-sourced and intelligent algo-trading platform, which could be used by researchers and individual users.
- Jasmina Stevanov (Management). In her research she is using machine learning and eye-tracking techniques to explore individual preferences for visual art, with the goal to offer automatic feedback about observers' aesthetic preferences and predict their future choices.
- Laszlo Talas (Bristol Veterinary School). With a background in zoology and experimental psychology, he is particularly passionate about how visual scenes can be "understood" using computers and what comparisons can be drawn with biological visual systems.

See the full list of awards

## Funding successes: Part 1

Dr Vikki Neville (Bristol Veterinary School, pictured) received a £399,830 Discovery Fellowship from the **Biotechnology and Biological Sciences Research Council** for *Developing a translational and computational approach to studying animal affect and welfare*. Fellowships are offered to individuals poised to become outstanding researchers and leaders in their field.



Drs Amanda Owen-Smith and Karen Coulman (both Bristol Medical School: Population Health Sciences) based in the Health Economics Bristol group were awarded grants from the **National Institute for Health and Care Research**. The first, for £325,699, entitled *A qualitative study to understand the engagement, access, referral, and experiences of people with depression who might benefit from weight management services*, will examine the accessibility and appropriateness of Weight Management Services for people living with common mental health conditions. It will run Jan '23-Dec '24. This is a collaboration between the Universities of Bristol, Birmingham, and East Anglia, alongside a number of service-based co-applicants.

The second relates to improving the accessibility and utility of community-based Weight Management Services to people with learning disabilities, and is an exploratory study initially investigating interventions to improve engagement between weight management teams and carers.

## Syncing of brain regions helps retain memories

Learning, remembering something, and recalling memories is supported by multiple separate groups of neurons connected inside and across key regions in the brain. If these neural assemblies fail to sync together at the right time, the memories are lost, a new study led by the Universities of Bristol and Heidelberg has found.

"Neural assemblies" – groups of neurons that join forces to process information – were first proposed over 70 years ago, but have proved difficult to pinpoint. Using brain recordings in rats, the research team has shown that memory encoding, storage and recall is supported by dynamic interactions incorporating multiple neural assemblies formed within and between the hippocampus and prefrontal cortex. When the co-ordination of these assemblies fails, the animals made mistakes.

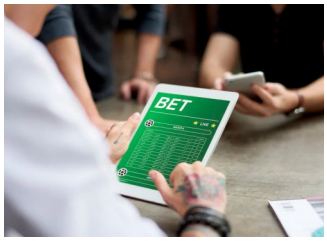
The next steps for the research would be to modulate neural assembly interactions, either using drugs or via brain stimulation, which Dr Michał Kucewicz (lead author, now at Gdansk University) is currently doing in human patients, to test whether disrupting or augmenting them would impair or enhance remembering. The research team presumes the same mechanisms would work in human patients to restore memory functions impaired in a particular brain disorder.

Domanski A *et al*. (2023). Distinct hippocampal-prefrontal neural assemblies coordinate memory encoding, maintenance, and recall. *Current Biology.*

## Problem gamblers have limited access to support

New research has shown a lack of support available for family members and friends of people with gambling problems.

A report published in April 2023 recommends the introduction of specific support services for the millions of people in Britain affected by someone else's gambling. The report, by a team at the University of Bristol supported by the abrdn Financial Fairness Trust, comes ahead of the expected publication of the government's White Paper on gambling reforms. The report calls for a major investment in services for those affected by someone else's gambling, including:



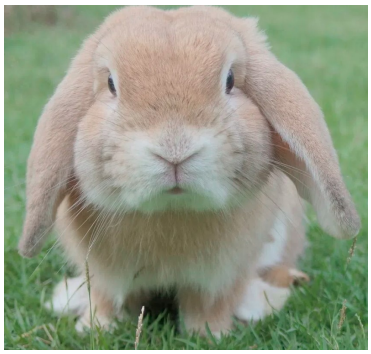

- The inclusion of specific services for affected others in strategic commissioning plans e.g. the NHS Long Term Plan and the National Gambling Treatment Service as well as increased funding for other types of provision.
- Regularly-run publicity and awareness-raising public health campaigns about the impact of gambling problems on on family members and friends.
- Clear, targeted messaging about the existing services that can provide the types of help and support family members and friends want.
- Making sure there is 'no wrong door' for people who seek help, whether they are someone who gambles or an affected other, including a simple way to find information online about the range of help available.

*Image © Raw Pixel*

## Pet rabbits need freedom to exercise

Pet rabbits have higher levels of the stress hormone - corticosterone - and show activity rebound when kept in small hutches with restricted exercise, new research has found. The research, funded by the RSPCA, highlights the importance that pairs of pet rabbits should have the freedom to exercise outside their home enclosure even when they are kept in hutches larger than the traditional size.

The aim of the study was to investigate the effects of common hutch sizes and access to an exercise area on the welfare of pet rabbits kept in pairs. The study showed rabbit pairs were more active when run access was restricted to three



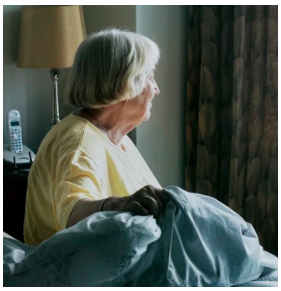
hours. Irrespective of the hutch size, physical activity including play jumps increased significantly when the pairs with restricted access were released into the run. The researchers suggest this activity rebound demonstrates the rabbits' need to move every day, and their welfare is compromised when they can only do so at midday.

The research team found there is a significant interaction between hutch size and run access on activity and stress hormone levels, which were highest in the pairs kept in small hutches with restricted run access. When rabbits had unrestricted access to the run, midday was the rabbits' least active time.

Rooney N *et al*. (2023). Run access, hutch size and time-of-day affect welfare-relevant behaviour and faecal corticosterone in pair-housed pet rabbits. *Applied Animal Behaviour Science*. *Image © Raw Pixel*

## Depression in Alzheimer's

Depression in dementia is common; up to 16% of people with Alzheimer's disease develop depression, but it is not known why it is more common in those living with Alzheimer's than in older adults without dementia. Individuals with depression in dementia also appear to have different symptomatology with fewer symptoms of appetite reduction and thoughts of life not being worth living. Currently available antidepressants are ineffective, making the depression difficult to treat.



Researchers from Bristol's Dementia Research Group wanted to investigate whether risk factors known to increase the risk of depression in adults without dementia, also increased the risk of depression in those with Alzheimer's, to identify possible new treatment targets.

Using data from three major dementia-focused cohorts, they analysed depression ratings on 2,112 individuals with Alzheimer's and compared this with data from 1,380 participants with normal cognition. Results showed that risk factors for depression in Alzheimer's appear to differ to those for depression, supporting suggestions of a different pathological process, although a family or past history of depression was the strongest individual risk factor suggesting a possible genetic predisposition. Individuals with depression in Alzheimer's were more likely than those with the disease who are not depressed to develop apathy and other non-memory symptoms of Alzheimer's disease.

Sinclair L *et al*. (2023). Characterization of depressive symptoms in dementia and examination of possible risk factors. *Journal of Alzheimer's Disease*.

*Image © Raw Pixel*

## £2.1 million to study schizophrenia

Schizophrenia is a severe neurodevelopmental disorder, most commonly diagnosed in late teens/early 20s, that affects around 1% of the population. The disorder places a major burden on sufferers, carers and health services with high suicide rates in sufferers and consuming roughly 30% of NHS spending on adult mental health. In England alone, the economic cost of schizophrenia is estimated at £12 billion per year. Psychotherapy is not an effective treatment on its own, and licenced medications are often poorly tolerated.

A project award from the Medical Research Council, to be led by Prof Jack Mellor (School of Physiology, Pharmacology and Neuroscience), will use new data from large genetic studies of schizophrenia to identify common biological causes for cognitive changes. These genetic studies point towards changes at synapses, the connections between nerves, and their adaptability – a process that underlies learning and memory. The project forms a multi-disciplinary and cross-institutional partnership between research teams led by Mellor with Dr Mike Ashby, Profs Jon Hanley & Emma Robinson at Bristol, Prof Jeremy Hall at Cardiff University, and Prof Dimitri Kullmann at University College London, along with clinical research teams led by Dr Mike Carter and Dr Kasia Sieradzan in Bristol.

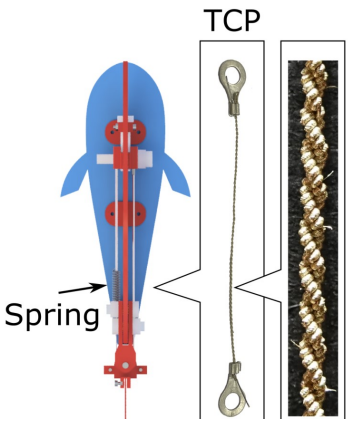
The five-year study, entitled *Impairment of neural plasticity and adaptive representations by genetic risk factors for schizophrenia*, will begin on 1 October 2023.

## Robot fish makes splash with motion breakthrough

A coil-powered robot fish designed by scientists at the University of Bristol could make underwater exploration more accessible.

The robot fish was fitted with a twisted and coiled polymer (TCP) to drive it forward, a light-weight low cost device that relies on temperature change to generate movement, which also limits its speed.

A TCP works by contracting like muscles when heated, converting the energy into mechanical motion. The TCP used in this work is warmed by Joule heating - the pass of current through an electrical conductor produces thermal energy and heats up the conductor. By minimising the distance between the TCP on one side of the robot fish and the spring on the other, this activates the fin at the rear, enabling the robot fish to reach new speeds. The undulating flapping of its rear fin was measured at a frequency of 2Hz, two waves per second. The frequency of the electric current is the same as the frequency of tail flap.




Until now, TCPs have been mostly used for applications such as wearable devices and robotic hands. The findings provide a new route to raising the actuation - the action of causing a machine or device to operate - frequency of TCPs through thermomechanical design and shows the possibility of using TCPs at high frequency in aqueous environments.

You TL *et al*. (2023). Robotic Fish driven by Twisted and Coiled Polymer Actuators at High Frequencies. Presented at the 6th IEEE-RAS International Conference on Soft Robotics (RoboSoft 2023).

*Image: Antagonistic muscles. © Tsam Lung You*

## GW4 funding for new innovation communities

The GW4 Alliance, which brings together the universities of Bath, Bristol, Cardiff and Exeter, announced funding for 10 new research and innovation communities in April 2023 as part of its Building Communities Programme. The programme aims to foster world-class research and innovation to address some of the most challenging problems the world faces today across the economy, society, the environment, and well-being. This year, there is a vast range of research and innovation communities funded, spanning a variety of research topics from geology to public health, refugees, and LGBTQ rights. All our new communities include at least three GW4 institutions, exemplifying the strength and value of our collaborative approach to research.

These new communities are in addition to the existing 100 collaborative research communities, which have cumulatively generated over £62.8m in research income since their formation.

Among the funded projects is **The Brain Tissue Engineering Community**, *Providing practical training to develop complex brain tissues for treating severe and incurable conditions*, led by Dr James Armstrong in Bristol Medical School.

Read about the projects here

## 'Mental Health Mission' funding boost

The University of Bristol is part of a £42.7 million 'Mental Health Mission' announced by the UK Government to accelerate research into mental health conditions, including those impacting children. The research will develop radical new treatments, improve the speed and accuracy of diagnosis and increase the use of technology to free up clinician time.

The psychosis theme of the Mental Health Mission has been awarded over £4 million by the Office for Life Sciences. Dr Sarah Sullivan (Bristol Medical School: Population Health Sciences) will be co-leading the psychosis prediction workstream of the psychosis theme alongside Dr Paolo Fusar Poli from Kings College London.

The Mission will be delivered through the National Institute for Health and Care Research (NIHR) Mental Health Translational Research Collaboration, a UK-wide network of leading investigators specialising in mental health research. The mission is one of the healthcare research priorities announced by the government last year as part of its Life Sciences Vision, and will take a Vaccine Taskforce style approach to tackling some of the biggest public health challenges facing the UK.

The funding will be used to:

- Bolster research to improve the treatment and care for those with mental illness
- Improve the use of data and digital technologies
- Fund two pilot studies to boost research and encourage investment
- Eliminate barriers for industry

Read the full University of Bristol news item

## Working with Catapult Centres

Five Bristol academics have recently won funding in the region of £50,000 from the national Research in Residence (RiR) funding competition which funds academics to work on an innovation project in partnership with the Catapult Network. The RiR scheme is managed by the Innovation Launchpad Network+, in which the University of Bristol is a founding partner.

A Catapult can help assess whether a concept tested in a university environment can be effectively scaled up to meet commercial requirements. Catapults can also be very helpful in finding routes to market, for example by developing technology demonstrators.

Amongst the funded projects is Prof Paul Howard-Jones (School of Education, pictured) for *Consumer learning journeys: an interdisciplinary framework to support net zero adoption*, working with the Energy Systems Catapult. The project aims to provide insights into consumer commitment to renewable energy technologies (such as heat pumps for home heating) which necessitate a long cognitive and emotional journey for many consumers. The project draws on psychology, neuroscience and education to frame the customer's "learning journey" from current to future energy worlds, identifying factors contributing to trust and positive responding, as well as potential touchpoints and levers to support consumer adoption of renewable energy.

Read the full University of Bristol news item

## Physiological Society prize

Frankie MacMillan, Professor of Biomedical Science Education in the School of Physiology, Pharmacology and Neuroscience (pictured), has been awarded the 2024 Otto Hutter Teaching Prize Lecture by the Physiological Society.

The prize recognises excellence and originality in physiology teaching at undergraduate level. Special consideration is given to those nominations that provide evidence of innovation in teaching and learning activities.

Prof MacMillan's work focuses on two main areas: supporting students in the transition to university; and creating innovative ways to improve their learning and confidence using games and non-traditional activities. She has developed a series of 'Programme Enhancement Activities' that include sessions to support students in their transition to university and engaging them with the learning community. Other activities that she has developed incorporate gamification to support students' learning including numeracy skills development, a histology card game and interactive workshops to develop scientific writing skills. She has also designed innovative final-year research projects including a cross-faculty project on classical and physiological perspectives of sex and gender.

## Hard Evidence – a theatrical and research legacy

Thriving Theatre is a new theatre support group for people with lived experience of domestic abuse. It was established by the team behind Hard Evidence, a play about domestic abuse, mutual support and the empowering effect of public involvement in research.

The characters and storyline of Hard Evidence were developed by Shass Blake and Alison Prince in collaboration with Ingrid Jones at Acta Community Theatre. Shass and Alison met during the coMforT (Mindfulness for Trauma) study) led by Dr Natalia Lewis at the National Institute for Health and Care Research Bristol Biomedical Research Centre and wrote the piece over Zoom during the first months of 2021.

They wanted their play to show how being a public contributor in a research study can empower women to support each other after experiencing domestic abuse. The play was originally performed in November 2021 and went on tour around Bristol in the summer of 2022.

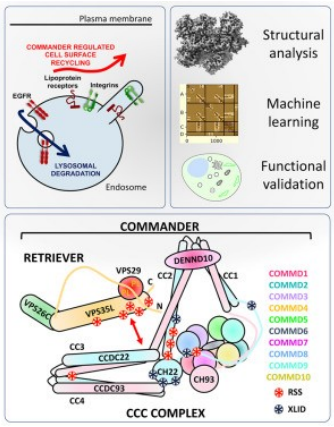
Collaborating on the project made the team behind Hard Evidence realise that they wanted to continue working together in a creative space. To achieve this, Acta Community Theatre fundraised and received a grant from Quartet Community Foundation that allowed them to set up a theatre group for people with lived experience of domestic abuse.

Thriving Theatre offers people with lived experience of domestic abuse a safe space to be creative, but it does not have a specific focus on abuse and trauma. It was established in January 2023 and has been meeting on a weekly basis since then. Members have experience of domestic abuse but there are no expectations that they will have to share their stories.

Read the full news story on the Bristol Biomedical Research Centre page

## The role of artificial intelligence in preventing disease

Researchers at the Universities of Bristol and Queensland (Australia), and the Medical Research Council Laboratory of Molecular Biology in Cambridge, sought to understand how Commander, a molecular machine composed of sixteen individual proteins, is assembled and how mutations in its function play a role in Ritscher-Schinzel syndrome, a rare disease characterised by intellectual disability and development delay.




By combining biochemical and cell-based experiments with state-of-the-art artificial intelligence, the researchers were able to precisely define how individual parts of Commander come together to form the functional machine and how this acts as one of the cell's 'postal workers'. The Commander complex controls the transportation and sorting of proteins in the body, ensuring the right amount of protein is delivered to the right place in the cell.

Knowing the structure of the Commander complex has allowed the researchers to better understand how disease-causing mutations provoke Commander to malfunction in Ritscher-Schinzel syndrome and advance our understanding of how it is involved in other diseases.

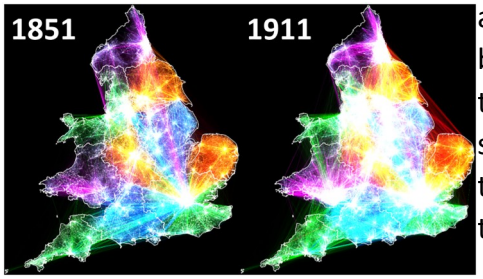
Healy MD *et al*. (2023). Structure of the endosomal Commander complex linked to Ritscher-Schinzel syndrome. *Cell*.

## Strong cultural regions slowed Britain's urbanisation

Regional cultural boundaries in England and Wales put a brake on the rapid urbanisation which took hold across Britain in the 19th and early 20th century, research has revealed.

Lead author Dr Joe Day, Lecturer in Historical Geography and Economic History, said: "The degree of similarity between the geography of human interactions today and in the past is astonishing. The migration patterns show a remarkable stability over time, and illustrates regions of England and Wales most people would recognise."

By building on previously established data sets, Dr Day and his team were able to analyse the distance migrated between a person's place of birth and their place of residence on census night. This data was used to develop several insightful migration network maps, demonstrating the patterns of migration remained highly consistent over the 60-year-period in the study.




This has the consequence that at a time in which the pace of urbanisation in Britain has never been as fast, before or since, it was nonetheless slowed by individuals' sense of identity and reluctance to migrate across cultural boundaries.

Day J *et al*. (2023). Mapping the cultural divides of England and Wales: Did the geographies of 'Belonging' act as a brake on British Urbanisation, 1851–1911? *PLOS Medicine*.

*Image: Principal migration routes, differentiated by cultural province of origin*

## World-leading integrative epidemiology research continues

The Medical Research Council Integrative Epidemiology Unit (MRC IEU) at the University of Bristol has been awarded funding to enable a further five years of world-leading research.

MRC IEU, which was established in 2013, is a leading centre for research into methods for causal inference, and evidence triangulation. It is also a leading centre for the application of causal methods to answer important questions about diseases in populations. Research from IEU enables valuable insight into many key challenges for population health, with important impact for further research, policy and practice.

The new funding, which began in April 2023, totals £11,637,000. It covers work spanning six key programme themes:

- Mendelian randomization
- Statistical methods for causal inference
- Data mining epidemiological relationships
- Molecular drivers and predictors of pregnancy complications and future health
- Immunopsychiatry
- Behavioural, social and environmental determinants of physical and mental health

The award will expand the methods the IEU develop and their application into new fields.

Read the full University of Bristol news item

## Alcohol dependency in adolescence linked with depression

Adolescents who show signs of alcohol dependence are more likely to develop depression by their mid-20s, according to a new study led by University of Bristol and UCL researchers.

They found that people who appeared to be dependent on alcohol at age 18 were more likely than their peers to have depression at age 24. Those with a score of zero on the alcohol dependence scale at age 18 face an 11% probability of depression by age 24, compared to 15% for those with a score of one on the scale (an increase from zero to one on the alcohol dependency scale represents a 28% increase in the probability of not being able to stop drinking once started and a 33% increase in the probability of failing to do what was normally expected of you). This relationship remained after they adjusted for potential confounding factors such as substance use and depressive symptoms at age 16, suggesting that there may be a causal relationship between alcohol dependence and subsequent depression that is not explained by poor overall mental health in adolescence. The team found that consumption levels alone were not associated with an increased risk of depression, which they say may be partly due to the fact that drinking in late adolescence is often tied with social contact and reflects social norms. Problematic drinking patterns could be a warning sign of future mental health problems, so helping young people to avoid problematic alcohol use could have long-term benefits to their mental health.

Hammerton G *et al*. (2023). The association of alcohol dependence and consumption during adolescence with depression in young adulthood... *The Lancet Psychiatry*

## Adaptations to a cold climate promoted social evolution

Scientists have uncovered evidence that a species' long-term adaptation to living in an extremely cold climate has led to the evolution of social behaviours including extended care by mothers, increased infant survival and the ability to live in large complex multi-level societies.

The study was led by researchers from Northwest University in China and a team including the University of Bristol and the University of Western Australia, and examined how langurs and odd-nosed monkeys adapted over time. By integrating ecological, geological, fossil, behavioural and genomic analyses, they found that colobine primates inhabiting colder environments tend to live in larger, more complex groups. More specifically, glacial periods during the past six million years promoted the selection of genes involved in cold-related energy metabolism and neurohormonal regulation.

They found that odd-nosed monkeys living in extremely cold locations had developed more efficient hormonal (dopamine and oxytocin) pathways that may lengthen maternal care, leading to longer periods of breastfeeding and an overall increase in infant survival. These changes also appear to have strengthened relationships between individuals, increased tolerance between males and enabled the evolution from independent one-male, multi-female groups to large complex multilevel societies.

Qi X-G *et al*. (2023). Adaptations to a cold climate promoted social evolution in Asian colobine primates. *Science*.

## Funding successes: Part 2

Professor of Molecular Neuroscience Jeremy Henley (School of Biochemistry,

pictured below) was awarded £16,800 from the **Biotechnology and Biological Sciences Research Council** International Partnering Award scheme for *Australia: SUMOylation and de-SUMOylation of neuronal proteins in health and disease.* Start April 2023 and completing in March 2024, the project aims to understand fundamental mechanism of SUMoylation and de SUMOytation under basal and disease condition, with the award covering costs for Dr Kevin Wilkinson and Jeremy to visit two collaborating labs in the Gold Coast and Sydney, Australia.

Dr Paul Dodson (School of Physiology, Pharmacology and Neuroscience, pictured left) received £206,204 from the University of Bristol's **GambleawareBristol Hub for Gambling Harms** for *GA risky decisions.* The project started in January 2023 and wis expected to complete in December 2025.

Dr Alastair Hales in the Department of Mechanical Engineering (pictured below) was awarded £308,334 from **The Faraday Institution** for *High Order Neural Networks for Accelerated Reduced Order Modelling*. The project started in April 2023 and is expected to complete within two years.

# FUNDING OPPORTUNITIES

**Research Professional** provides access to an extensive database of funding opportunities, and can send out tailored alerts based on specific keywords input by the user. UoB staff and students have **FREE** online access to the database from any device.

You can search for funding information by discipline, sponsor, database searches, by recent calls or by upcoming deadlines. If you register for the site and log in, you'll be able to:

- **Set up automated funding opportunity email alerts** - **tailored according to your discipline and research interests**
- **Save searches and bookmarks**
- **Sign up for higher education news bulletins**

Find out more about the platform on the RED website. Note that some calls may have an internal process; check the major bids webpage to see if such a process is in place.

The following listings represent a *brief selection* of available funding for the Bristol Neuroscience community. **Full listings of opportunities** are sent out via Faculty and/or School Research Directors, and **are available on the Research Development website**.

**Chan Zuckerberg Initiative**
Collaborative Pairs Pilot Project Awards

Closing date: 22 June 2023 Award amount: USD $200,000

These grant awards support pairs of investigators and their teams to explore innovative, interdisciplinary approaches to address critical challenges in the fields of neurodegenerative disease and fundamental neuroscience. The Collaborative Pairs Pilot Project Awards were developed as a funding mechanism to catalyse new collaborations and scientific partnerships and springboard early-stage projects that are bold, creative and "out-of-the-box."

**Roger De Spoelberch Foundation**
Roger De Spoelberch prize

Closing date: 30 June 2023 Award amount: €750,000

This recognises a clinical and basic scientific research project within the field of neurodegenerative diseases and psychiatric disorders. Applicants must hold a PhD and be under the age of 55 when the application is submitted. They must be nominated by a person who is duly qualified to assess the value of the candidate's work. They should preferably be a European national and be affiliated with a laboratory, clinic, hospital or other institution established in one such country. Previous prize winners are not eligible. The prize is worth up to €750,000, at least two-thirds of which must be spent directly on research and development costs. Funding may be used to cover the staff, investment and operating costs.

**Health Data Research UK**
Master's Degree Scholarships

Closing date: 30 June 2023 Award amount: £10,000

The fund will support up to ten students to carry out real-world health data science research. The scholarships will provide experience of working in an important area of healthcare research and offer the insights, knowledge and the experience and qualifications students need to enter the field. Scholars will have the opportunity to be involved in ARUK's Early Career Researcher programme activities and resources, such as training and networking events, career development and mentoring groups and membership of the ARUK Network.

**National Institute for Health and Care Research**
Clinical lectureships—medical

Closing date: 30 June 2023 Award amount: unspecified

These provide a clinical academic training environment for doctors to establish themselves as independent researchers and leaders. Lecturers spend 50 per cent of their time undertaking specialist clinical training and 50 per cent undertaking research or educationalist training. The lectureships have the following research themes: platform science and bioinformatics; epidemiology and public health; therapeutics or clinical pharmacology; health needs of older people; dementia; medical education; acute care; mental health; multimorbidity at any age.

**Action Medical Research / British Paediatric Neurology Association**
Research training fellowships

Closing date: 14 July 2023 Award amount: £275,000

These support training in research techniques and methodology in a subject relevant to the overall aims of the charity: to prevent and treat disease and disability by funding vital medical research in hospitals or research institutions across the UK. As part of this year's call, they have teamed up with and the BPNA; the proposed project must be related to clinical neurology and/or neuroscience, including neurodisability and neurodevelopment. Applicants are expected to be pre-doctoral trainee clinicians and will either already hold a UK or Irish specialist training post in Paediatric Neurology, or be planning to apply for a specialist training post in Paediatric Neurology or Neurodisability after completion of a PhD. Applicants can include paediatric neurosurgeons.

**Alzheimer's Research UK**
Research fellowships

Closing date: 26 July 2023 Award amount: £20,000 pa for up to three years

These support early-career non-clinical researchers beginning an independent project on Alzheimer's and related dementias. Applicants must hold a PhD and demonstrate evidence of previous research projects with impactful outputs. Those who hold tenure are not eligible.

# SHOWCASED ARTICLE

## Impact on alcohol selection and online purchasing of changing the proportion of available non-alcoholic versus alcoholic drinks: A randomised controlled trial

Clarke N, Blackwell AKM. Ferrar J, De-Loyde K *et al*. (2023). *PLOS Medicine*.

*Why was this study done?*

- Excessive alcohol consumption contributes to the global burden of non-communicable diseases, including cancer, heart disease, and stroke. Interventions that change physical and economic environments have the potential to reduce alcohol consumption.
- Interventions targeting physical environments include availability interventions that involve changing the proportion of healthier options that are available, relative to less healthy options.
- A previous online study found that increasing the availability of non-alcoholic compared to alcoholic drinks reduced the hypothetical selection of alcoholic drinks, but there is an absence of evidence from naturalistic settings.

*What did the researchers do and find?*

- This study evaluated the impact of increasing the proportion of non-alcoholic (relative to alcoholic) drinks, on selection and actual purchasing of alcohol.
- In a randomised controlled trial, 737 participants were randomly assigned to one of 3 groups with varying proportions of alcoholic versus non-alcoholic drinks ("25% non-alcoholic/75% alcoholic"; "50% non-alcoholic/50% alcoholic"; and "75% non-alcoholic/25% alcoholic").
- Participants selected drinks from 64 options in a simulated online supermarket that was designed to look and function similarly to an online supermarket. Participants were then required to immediately purchase the same drinks in an actual online supermarket.
- It was found that increasing the proportion of non-alcoholic drinks—from 25% to 50% or 75%—reduced the amount of alcohol selected and bought, in this online supermarket setting.

*What do these findings mean?*

- This study provides evidence that increasing the proportion of non-alcoholic drinks could reduce alcohol selection and purchasing, highlighting the potential for availability interventions to reduce alcohol sales at the population level.
- Further studies are warranted to assess whether these effects are realised in a range of real-world settings.

# CONTACTS

## Bristol Neuroscience

**Lead**: Paul Chadderton, Associate Professor in Neurophysiology

**Memory Hub Lead**: Emma Cahill, Lecturer
*Area of research* - Physiological basis of memory and adaptive behaviour

**Movement Hub Lead**: Paul Chadderton, Associate Professor in Neurophysiology
*Area of research* - to reveal the cellular and circuit mechanisms involved in motor control and learning in the cerebellum

**Neural Computation Hub Lead**: Conor Houghton, Associate Professor in Computer Science
*Area of research* - understanding information processing and coding in the brain

**Sleep Hub Lead**: Matt Jones, Professorial Research Fellow in Neuroscience
*Area of research* - neuronal networks in cognition and disease

**Mental Health Hub Lead**: in progress

**Network Facilitator:** Joseph Butler, *Research Development Manager (interim), Faculty of Life Sciences*

**Network Administrator:** Catherine Brown (Elizabeth Blackwell Institute)

20 years bristol neuroscience

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