



Your Hub for Biological Rhythms in the UK

ABOUT US

Our main objective is to support the clock community in creating bridges between chronobiological research and real-world impact.

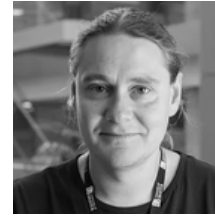
The mission of BioClocks UK is to consolidate, engage, and expand our research network in order to establish and nurture robust cycles of discovery and impact.



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EDITORIAL INSIGHTS



Prof. Antony Dodd
Antony.Dodd@jic.ac.uk

Welcome to the first edition of the BioClocks UK newsletter! In this update, we have exciting news about BBSRC funding for BioClocks UK, spotlights on chronobiology research at the University of Warwick and University of York, a focus on new PI Sarah Chellappa, background to the Circadian Mental Health Network, a report on a workshop at the University of Surrey, background and context to the formation of BioClocks UK, and updates about the UK Clock Club meeting series.

The aim of BioClocks UK is to provide a hub for UK chronobiology research, with a particular focus on training, the translation of underpinning research, and development of research-informed policy. One part of this hub is the BioClocks UK website (<https://www.bioclocks.uk>), which will soon include an Expertise Database from across the UK chronobiology research community.

I thank those contributing to this newsletter; particularly, Robert Dallman and Seth Davis for assembling the spotlights on Warwick and York, Bambos Kyriacou for writing about BioClocks UK funding, Jo Menzies in John O'Neill's lab for summarizing the autumn Clock Club at the LMB, Sara Montagnese and Debra Skene for summarizing the Chronobiology workshop at Surrey, Amy Ferguson for introducing the Circadian Mental Health Network, the entire BioClocks UK team for preparing the background information (page 16), and Andrew Millar for initiating BioClocks UK. I am very grateful to Marissa Valdivia-Cabrera in Edinburgh for assembling this newsletter, and to the Royal Society of Edinburgh for funding the initiative.

BBSRC RESPONSIVE MODE FUNDING FOR BIOCLOCKS UK

By: Bambos Kyriacou

We are very pleased that a responsive-mode application to BBSRC for a 5-year funding programme for BioClocks UK was successful, with the formal announcement made in December 2023. As responsive mode applications are normally for research grants, the fact that BBSRC saw fit to underwrite the costs associated with a BioClocks UK coordinator who will not be doing any formal research, should be viewed as something close to a miracle! Clearly they must have found some money down the back of a BBSRC sofa! The post will be held at the University of Leicester with PI Bambos Kyriacou and Co-Is Hannah Rees (Aberystwyth) and Andrew Millar (Edinburgh), and is being advertised during March 2024. The proposal focuses on translating the research findings of the chronobiology community into impact, something that all BBSRC research grants are supposed to do but seldom achieve. BioClocks UK will make our research group more visible, and to new audiences, thus amplifying the voice of UK chronobiology research.

The coordinator will most likely be a chronobiology PhD/postdoc, an excellent communicator, both written and verbal, have web skills to develop the BioClocks UK website, will liaise with clock groups and develop research ideas for future interactions and funding, help arrange clock club meetings and sponsorship, etc. The main job is to communicate chronobiological principles to interest groups and stakeholders such as local and national government, industry and commerce, educational and health institutions, emergency services, architects and building designers, mental health professionals etc and try to convince them to apply these principles and ideas within their environments for the benefit of their workers. Consequently, this is an important position that requires initiative, creativity and resilience, as well as a willingness to travel the length and breadth of the UK to send out our message (Leicester, being so central, is highly convenient in this context).

**If you are interested in this post,
please contact Bambos Kyriacou by
email or phone for an informal
discussion
cpk@leicester.ac.uk or
0116 2523430**

HERE BE (BEARDED) DRAGONS - AUTUMN CLOCK CLUB REVIEW, 6TH OCTOBER 2023

By: Jo Menzies, PhD student, O'Neill Lab (LMB)

On an otherwise drab and dreary Cambridge autumn day, the O'Neill and Hastings labs of the MRC Laboratory of Molecular Biology played host to a sparkling exhibition of chronobiology research. The packed schedule served up a generous 13 talks, with 185 attendees representing as many as 34 institutes and 14 industry partners.

Before you could whisper the words "Chronophage/cheese scone" the audience was pitched into the first session; taking a greatest hits tour of circadian model systems, Arabidopsis, cyanobacteria and the SCN. Then followed the data blitz, a staccato barrage of micro-talks that offered a tantalising glimpse of diverse research projects. After this, the poster session featured a bounty of impressive displays that showcased the breadth of circadian research in the UK. Jack Dorling and *Bacillus subtilis* proved a formidable partnership, with an impressive data blitz/poster prize double-salvo.

The tricky post-lunch session proved no issue for the next slew of speakers, who skilfully navigated us through fascinating insights on novel resetting cues for skeletal clocks, regulation of solute clearance by brain lymphatic endothelial cells, and the difficulties of managing circadian disruption in hospital patients, amongst others. In the afternoon session, we were introduced to the captivating world of the bearded dragon. Our guide, Emma Morris, enlightened us regarding the circadian regulation of the pineal gland in these intriguing creatures. To conclude the day, Hiroki Ueda treated us to a brilliant keynote, diving deep into phosphorylation and its relation to sleep. A tour-de-force that was equal parts engrossing and candid, a worthy climax to leave the audience wide awake and bristling for some well-earned refreshments.

The O'Neill and Hastings labs would like to express our gratitude to all speakers, data blitzers and poster presenters, abstract submitters and of course everybody who attended and engaged to make this a memorable day. We would also like to acknowledge our industry sponsors for enabling us to put this on. Finally, thanks to all the organisers, particularly Nina Rzechorzek, whose unerring labours of administration contributed to this event's marvellous success.

PRIZE WINNERS

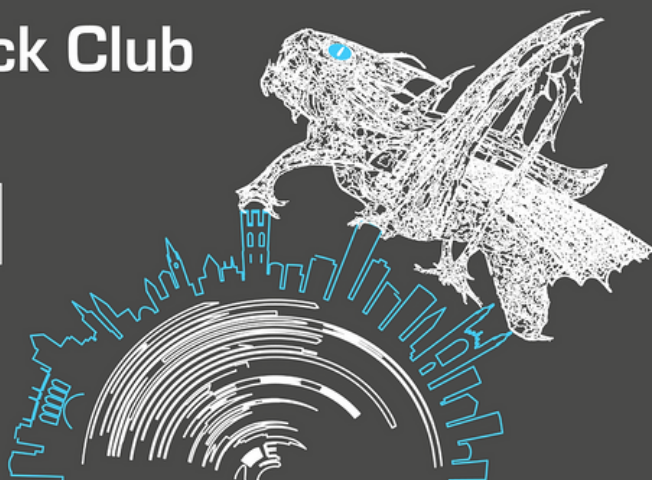
Poster - 1st, Jack Dorling (Dodd Lab, John Innes Centre). 2nd, Emma Picot (Gifford/Carre Labs, University of Warwick).

Data Blitz - 1st, Jack Dorling (Dodd Lab, John Innes Centre). 2nd, Deirdre Lynch (Dodd Lab, John Innes Centre).

Talk - 1st Emma Morris (Laurent Lab, Max Planck Institute for Brain Research). 2nd, Sasha Eremina (Locke Lab, Sainsbury Laboratory Cambridge)

Autumn Clock Club
Cambridge

06 -10 - 23



NEW PI: DR. SARAH L. CHELLAPPA

Contact:

s.l.chellappa@soton.ac.uk

Sarah L. Chellappa, MD, MPH, PhD, is an Associate Professor at the University of Southampton, UK. Dr. Chellappa's work has shown that sleep and circadian rhythms affect mood, cognition and brain activity in a variety of human populations, including healthy young and older adults, shift workers, patients with depression, patients with ocular diseases, and in individuals with neurodevelopmental conditions.

Their work combines multimodal neuroimaging approaches to assess how sleep and circadian rhythms affect brain activity that modulate mood and cognition. This work also includes sleep/circadian interventions to help improve mood, health and well-being using targeted light exposure and, more recently targeted nutritional interventions (meal timing) to improve cardiometabolic and mental health in humans.

- **Dr. Chellappa has authored more than 60 papers in prestigious journals including Science, Lancet, Science Advances, Nature Communications, Proceedings of the National Academy of Sciences of the United States, JAMA Ophthalmology, among others.**
- **She has consistently acquired funding to support their research.**
- **Dr. Chellappa is an active supporter of Diversity, Equity and Inclusivity, and is a neurodivergent self-advocate and a mental health lived expert.**



IMAGE PROVIDED BY DR. CHELLAPPA

WARWICK RESEARCH GROUPS

DR. ROBERT DALLMANN

Robert Dallmann's group (Warwick Medical School) is interested in translational chronomedicine. Methods reach from molecular biology including omics methods to determine circadian disruption phenotypes to pharmacology and pharmacodynamic studies in cellular in vitro and in vivo models to establish time-of-day as a variable in pharmacotherapy. Together with **David Rand** (Maths) he is working on a novel method to determine circadian function and phase from single time-point samples that can be utilised in experimental models as well as patient samples. Currently, the focus is on questioning whether human tumours have functional circadian clocks or not, and why it might matter.



Dr. Robert Dallmann

R.Dallmann@warwick.ac.uk



Prof. David Rand



Prof. Bärbel Finkenstädt

B.F.Finkenstadt@warwick.ac.uk

PROF. BÄRBEL FINKENSTÄDT

Bärbel Finkenstädt (Warwick Statistics Department) is interested in developing statistical methods for interdisciplinary applications in life sciences. She has worked on modelling circadian gene expression combined with inference from temporal and spatio-temporal data from single cells to meta-populations. In collaboration with members of the chronotherapy group at Warwick and University Paris Saclay, she is developing statistical methods for estimating parameters for quantifying the maintenance of a good circadian rhythm and computation of an individual's circadian phase as a reference point for chronotherapy, from telemonitoring circadian biomarkers, such as temperature and physical activity, with wearable sensing devices. The work addresses personalized medicine for cancer patients and has broad implications for other scenarios where daily telemonitoring is of interest, and other diseases that benefit from chronotherapy.

WARWICK RESEARCH GROUPS



PROF. ISABELLE CARRÉ

Isabelle Carré's current work focuses on how the plant circadian clock impacts on interactions with microorganisms. With Katherine Denby (now at the University of York) and Laura Roden (now at Coventry University), she showed that the plant clock maximises resistance to infection by the fungal pathogen *Botrytis cinerea* by priming immunity in the morning, coinciding with the time when fungal spores are released (Ingle et al, *Plant J.*, 2015). Work with **Miriam Gifford** at Warwick showed that the plant clock influences the success of symbiotic interactions between legumes and nitrogen-fixing rhizobia and suggested that circadian regulation of a family of cysteine-rich peptides (NCRs) may play an important role (Achom et al., *J. Exp. Bot.*, 2022). Another project with **Gary Bending**, also at Warwick, uncovered daily changes in composition of bacteria and fungi in the thin layer of soil surrounding plant roots, known as the rhizosphere, and demonstrated that these rhythms were largely driven by the clock of the plant host (Newman et al, *BMC Biol.*, 2022). Current research aims to uncover the mechanisms by which circadian regulation of plant-microbe interactions benefits plant fitness and productivity.



Prof. Isabelle Carré

Isabelle.Carre@warwick.ac.uk



Prof. Gary Bending

Gary.Bending@warwick.ac.uk



Prof. Miriam Gifford

M.L.Gifford@warwick.ac.uk

DR. BRUNO MARTINS

Bruno Martins' group applies a systems approach to understand how the cyanobacterial clock is embedded within the regulatory fabric of the cell. The *Synechococcus elongatus* clock is one of the simplest known clocks, consisting of just a few interacting and well characterised proteins. By studying this simple system, we can establish the principles of how clocks and other cellular processes interact in different physiological and environmental contexts. For example, how do the clock and the cell cycle interact with one another to coordinate growth, chromosomal replication and segregation, and cell division? How is the clock modulated by intracellular energy states, as well as extracellular environmental changes? Can we use synthetic biology to control the oscillatory dynamics of the clock and design new circuits? We believe the best way to understand natural circuits and to build new ones is through an iteration of experiment and theory. Our approach is therefore highly interdisciplinary, combining single-cell microscopy, synthetic biology, microfluidics and mathematical models.



Dr. Bruno Martins

Bruno.Martins@warwick.ac.uk

PROF. MICHELLE A. MILLER



Prof. Michelle Miller

Michelle.Miller@warwick.ac.uk

Michelle A Miller, Warwick Medical School (WMS), leads the international 'Sleep, Health and Society' research and teaching programme. She is currently the Chief Investigator of the NIHR funded Trial: FOUND (Finding Obstructive sleep apnoea Using a Novel Device). Her research spans several disciplines, including biochemistry, genetics, epidemiology, and population health science. She has an interest in sleep and circadian rhythm disturbance and cancer and, the effect of shift work, travel, school start times and clock changes on performance, health, and wellbeing.

WARWICK RESEARCH GROUPS

DR. TALAR MOUKHTARIAN

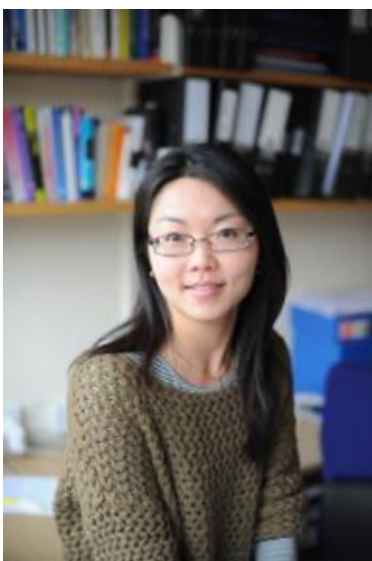
Talar Moukhtarian (Warwick Medical School) has a background in clinical psychopathology, specialising in the differential diagnosis of adult ADHD and borderline personality disorder. With a strong foundation in mental health assessments, her journey has evolved into a pioneering role in the realm of digital mental health. Currently, she is at the forefront of developing and delivering psychological interventions. Her expertise spans a diverse range of areas, including sleep and insomnia, depression, anxiety, and eating disorders. Beyond traditional clinical settings, she is committed to exploring novel avenues for delivering psychological interventions extending to workplaces and schools, where she aims to implement effective preventative mental health strategies. Talar is currently PI on an MRC-funded project working with shift workers and businesses across the UK to develop a novel preventative sleep and wellbeing intervention for shift workers. A proponent of research culture, Talar is also actively involved in promoting open research practices, including a strong focus on reproducibility.



Dr. Talar Moukhtarian

[talar_rita.moukhtarian](mailto:talar_rita.moukhtarian@warwick.ac.uk)

@warwick.ac.uk



Prof. Nicole Tang

N.Tang@warwick.ac.uk

PROF. NICOLE TANG

Nicole Tang (Department of Psychology) is a clinical and health psychologist interested in sleep, insomnia, chronic pain, physical activity rhythm, suicide risk, and mental health in general. The ultimate goal of my research is to build an all-round evidence base to inform treatment development. At Warwick, I direct the Warwick Sleep and Pain Laboratory. I lead a range of projects, from experimental studies to qualitative studies; from meta-analysis, secondary data analysis, experience sampling studies, to multi-centre randomised controlled trials.

I am particularly experienced in developing hybrid cognitive behaviour therapy (hybrid CBT) to tackle complex comorbid conditions.



THE CHAWLA LAB

The Chawla lab uses *Drosophila melanogaster* and mammalian primary neuronal cultures to study how circadian rhythms and sleep are affected by cellular oxidative stress and in neurodegenerative conditions such as Parkinson's disease. In particular, we interrogate how signalling pathways involved in synapse-to-nucleus communication are altered by neurological conditions and cellular redox status and how this links to the molecular circadian clock. Our work has focussed primarily on Parkinsonian fly models e.g. LRRK2 and DJ-1 mutants. The Chawla and Davis groups have worked together on the *C.elegans* circadian transcriptome identifying novel gene sets that show circadian oscillations and ultradian gene expression oscillations that persist in 24-h cycling environmental conditions.

Team:

Timothy Johnston (PhD student) is studying the role of sulfiredoxin-1 in neuronal ROS homeostasis.



Dr. Sangeeta Chawla

sc759@york.ac.uk



Prof. Seth J. Davis

seth.davis@york.ac.uk

PROF. SETH J. DAVIS

Using *Arabidopsis* and barley, we have worked to unravel the mechanistic interconnections of environmental sensing under diurnal conditions with immediate use in crop improvement. Here our interests are focused on circadian-clock mechanism, daily inputs to the clock and the quantitative analysis of clock outputs. In this there is use of systems modelling, metabolite profiling, cell biology, quantitative genetics and molecular genetics. All of this is to provide a closed-loop mechanism of the clock. In connecting quantitative discoveries to crop improvement we have contributed to describing the genetics of the barley oscillator and collaborated to show how allelic variation in clock genes are associated to developmental and metabolic traits associated to yield, particularly in clock variants grown in unfavourable conditions.



THE EZER LAB

The Ezer lab is interested in how plants respond to environmental changes across different time scales—minute-by-minute, hour-by-hour, day-by-day, season-by-season. The plant circadian clock is a central component of environmental signal integration across these varied time scales. Moreover, we are interested in how asynchronous internal timings contribute to trait heterogeneity in plant populations. We have a strong computational biology component in our lab and are developing computational tools that should be utilised for analysing circadian rhythms across all systems. Our lab has a set-up to programme complex light schedules, including realistic sunrises and sunsets, enabling us to explore entrainment at a deep level. We are also applying our knowledge to improve the energy efficiency of vertical farms.



Dr. Daphne Ezer

daphne.ezer@york.ac.uk

Team:

Dr. Sarah Lock is currently developing a new R package for analysing non-stationary circadian rhythms, which we hope will become as core a component of biological rhythm analysis across biological systems as 'BioDare'. She is also interested in the genetic basis of 'jet lag' in plants.

Ethan Redmond (PhD student) is interested in how the clock rhythms change as plants age.

Gina Vong (PhD student) is interested in how plants respond to sunrises and has engineered our light set-ups.

Dr. Kayla McCarthy is interested in how the circadian clock helps in bet-hedging to enable survival under fluctuating environmental conditions.

Hailey Tan (PhD student) is interested in how plants integrate diurnal temperature, light and humidity fluctuations in the context of their age.

Will Claydon (Technician) is leading our effort to design custom light regimes to improve the energy efficiency of a new vertical farm in a children's hospital in Liverpool, exploiting what we know about how plants adapt to different day lengths.

**Dr. James Ronald**

James.Ronald@glasgow.ac.uk

DR. JAMES RONALD

James Ronald was recently awarded a BBSRC Discovery Fellowship to develop his own independent research programme on plant circadian biology. He has a broad interest in post-translational regulation. His current fellowship will be focused on circadian cellular dynamics: where and when are circadian proteins localising in the cell, how does light and temperature signals control these behaviours and what is the consequence of perturbing these dynamics?

DEPARTMENT OF MATHEMATICS**PROF. MARINA KNIGHT, DR. JESS HARGREAVES (STATISTICS)
AND PROF. JON PITCHFORD (MATHEMATICAL BIOLOGY)****Prof. Marina Knight**

marina.knight@york.ac.uk

**Dr. Jess Hargreaves**

Jessica.Hargreaves@york.ac.uk

**Prof. Jon Pitchford**

jwp5@york.ac.uk

At the University of York, interdisciplinary teams from Mathematics and Biology collaborate on projects to develop methods and software tools for understanding biological data. Utilising strong links between departments and building on strengths in mathematical modelling and data science, we develop methodological and computational tools, underpinned by rigorous mathematics and statistics, for analysing rhythmic biological data. Established collaborations are in place with the Chawla, Davis and Ezer labs. Driven by these interactions, we contribute to the wider community through e.g., introducing new methodology for replicate circadian rhythms modelled as nonstationary time series, including clustering and hypothesis testing procedures; mining complex rhythmic data through functional dimension reduction and regression techniques, as well as contributing to clock inference via novel ordinary differential equation (ODE) simulation and modelling.

WORKSHOP: ASSESSING EVIDENCE IN TRANSLATIONAL CHRONOBIOLOGY

12-13 JUNE 2023 AT THE UNIVERSITY OF SURREY, UK

By Sara Montagnese and Debra Skene,
on behalf of the Scientific and Organising Committee

full program at <https://www.ias.surrey.ac.uk/event/assessing-evidence-in-translational-chronobiology/>

One of the challenges in translating chronobiology research into clinical practice are the differences in evaluating evidence between basic scientists and clinicians. The aim of our workshop was to bring together scientists with different backgrounds in order to evaluate the available evidence for Daylight Saving Time (DST) contributing to road traffic accidents, and for delayed school times resulting in increased sleep duration in high school children. These were discussed by use of the following methods:

- The literature was interrogated via two very well-defined PICO (Population, Intervention, Comparator, Outcome) questions, i.e.:
 1. Do healthy individuals (P) have an increased risk of road traffic accidents (O) during the Daylight-Saving Time months (April-October)(I) compared to the standard time months (November-March)(C)?
 2. Are delayed school start times (I) associated with longer sleep duration (O) in high school students (P)? (Comparator: standard school times)
- The evidence was first examined and summarised in a comprehensive, detailed fashion by two PhD students, one with a neurobiological and one with a clinical background.
- Then the evidence was analysed from more specific perspectives: that of a chronobiologist and a transportation safety engineer for the DST-centred question, and that of a chronobiologist and an evidence-based medicine expert (Cochrane) for the question on school times and sleep duration.
- Finally, the audience, acting as a Delphi panel (i.e. the type of panel that generally reviews PICO-based clinical practice guidelines), discussed the overall evidence and attempts were made at producing and voting statements and recommendations.

Prof. David McDaid, from the London School of Economics, gave a keynote lecture on how to approach stakeholders in order to help transform scientific evidence/recommendations into actual policies.



IMAGE CREDIT: MRS. MIRELA DUMIC (INSTITUTE OF ADVANCED STUDIES, UNIVERSITY OF SURREY)

OUTCOMES AND NEXT STEPS

While the debate on the relationship between DST and road traffic accidents highlighted considerable heterogeneity in the literature (the origin of which was discussed and largely clarified), that on the relationship between school starting times and sleep duration lead to more clear-cut results, and will lead to the production and publication of a meta-analysis. Existing individuals/committees/panels will be contacted in relation to practical strategies to turn available knowledge on the relationship between DST and road traffic accidents and that on school start times on sleep duration into relevant public health campaigns.

THE CIRCADIAN MENTAL HEALTH NETWORK



By Amy Ferguson

Network Scientific Coordinator

afergus8@ed.ac.uk

I introduced our 3-year, MRC-funded network at the Surrey Clock Club, when we had just started. It has now been six months since the official launch event of the Circadian Mental Health Network, and the Network has been busy working on each of our four objectives. You can find out more about our objectives and our launch event on our website (<https://www.circadianmentalhealth.org/>).



Image taken from:

<https://www.circadianmentalhealth.org/about-the-network>

The Network has been working with both The McPin Foundation and the James Lind Alliance to ensure the views of individuals with lived experience of mental health conditions and/or disturbed sleep and circadian rhythms are incorporated throughout the Network. With The McPin Foundation we have established a Lived Experience Advisory Panel (LEAP) comprised of individuals from many different backgrounds, ages, and experiences. We have also been working with a Steering Group comprised of individuals with lived experience, charity members (including Bipolar Scotland and The Sleep Charity), clinicians and research community members, in partnership with the James Lind Alliance to develop a public survey to identify the important questions in this field according to those impacted. We will be releasing this survey soon, and we hope you can help us share it widely.

The Network has recently had its first publication: an opinion article on the importance of prioritizing a simple and practical approach to creating comprehensive circadian and sleep meta-data using README templates. You can find the article in *Clocks & Sleep*. You can also access our ongoing work in set standards for data collection, data curation and data sharing through our GitHub.

A major goal of the Network is to support Early Career Researchers (ECRs). To do that we are establishing an ECR Advisory Board to ensure the views of ECRs are heard, we welcome any ECR interested in getting involved to please get in touch. We will also be launching a funding call to support ECR activities, with more details coming soon (please join our mailing list or follow our social media for updates).

We have been working to establish an inclusive and supportive Network working alongside our partners and by introducing the Network at various conferences and meetings (including Clock Club). We hope to continue to build strong relationship with the research community in the areas of circadian rhythms, sleep, and mental health in the future. If you would like to join our Network mailing list, please get in touch with Amy Ferguson.

SAVE THE DATE FOR SPRING CLOCK CLUB!



Time and Location

29 Apr 2024, 11:00 – 30 Apr 2024, 12:00
Gillmorehill Campus, University of Glasgow

THE NEXT UK CLOCK CLUB WILL BE HOSTED BY THE UNIVERSITY OF GLASGOW, WITH A FABULOUS KEYNOTE SPEAKER LINED UP, **PROF. KRISTIN TESSMAR-RAIBLE**, A HYBRID SESSION WITH UCSD CENTER FOR CIRCADIAN BIOLOGY AND A CHOICE OF TWO SATELLITE TRAINING EVENTS, FEATURING **WORKSHOPS ON POLICY AND PPIE TRAINING** (DETAILS BELOW), BROUGHT TO YOU BY BIOCLOCKS UK.

WORKSHOPS:

BioClocks UK Policy

In person, 9-12 noon, Tuesday April 30th

University of Glasgow

Hosted by: **Dr. Dave Blackbell**, Co-Director of the Scottish Research and Policy Exchange; **Prof. Sara Montagnese**, University of Surrey; **Prof. Russell Foster**, University of Oxford; and **Prof. Andrew Millar**, University of Edinburgh.

BioClocks UK Patient/Public Participation

In person, 9-12 noon, Tuesday April 30th

University of Glasgow

Hosted by **Prof. Malcolm von Schantz**, Northumbria University, MRC Circadian and Mental Health Network; **Dr. Iain Campbell**, AMBIENT-BD project; **Dr. Amy Ferguson**, MRC Network Coordinator; and **Maja Mitchell-Grigorjeva**, Delivery and Development Manager, Bipolar Scotland.

WORKSHOPS ARE FREE TO ATTEND BUT NUMBERS ARE LIMITED

Find more information and register in the following link:

<https://www.bioclocks.uk/event-details/spring-clock-club-2024-glasgow>

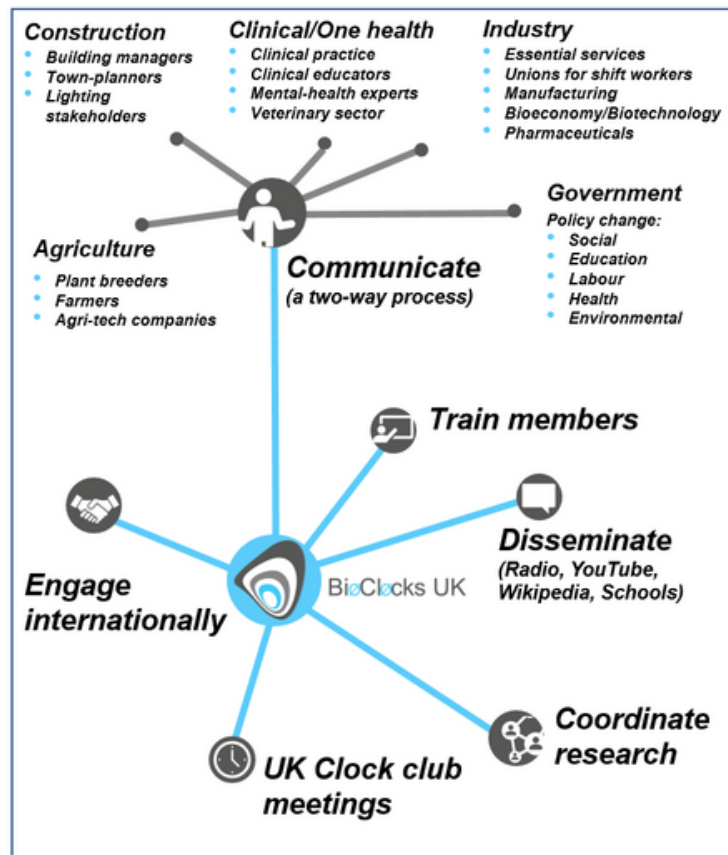
ABOUT: **BioClocks UK**

BioClocks UK represents the UK researchers who study biological rhythms.

The organisation was started by volunteers from universities, BBSRC-supported institutes John Innes Centre and IBERS, and the MRC Laboratory of Molecular Biology.

BioClocks UK aims to catalyse a community-wide transition in outreach, training and impact from this area of UK research success.

Main Activities:



BioClocks UK Expertise Database - *open for submissions!*

We would like to invite contributions from PIs (Group Leaders) and independently-funded Research Fellows working in chronobiology and/or sleep, and based in the UK.

Please find below a link to the data capture form.

<https://forms.wix.com/r/7095627099909652992>

We look forward to receiving your submissions!

INSIGHTS FROM BIOCLOCKS UK'S SURVEY 2023

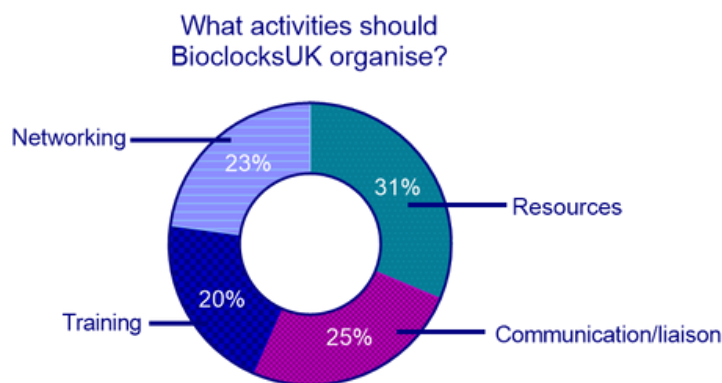
Poll prepared by: Robert Dallmann, for the BioClocks UK volunteers.
Data analysed by: Robert Dallmann with input from Andrew Millar.

The BioClocks UK volunteers designed a survey on the possible objectives for the new community organisation, and Robert Dallmann implemented it on the Vevox platform. Responses were gathered in February to April 2023, from people who attended the Surrey UK Clock Club in person, from two Town Hall meetings online, and from a call to the UKClockClub email list. 131 surveys were returned, of which 80-85 answered the questions summarised below. The respondents supported all the areas proposed. The first or full-ranked answers to some questions focussed on research processes, as we explain below.

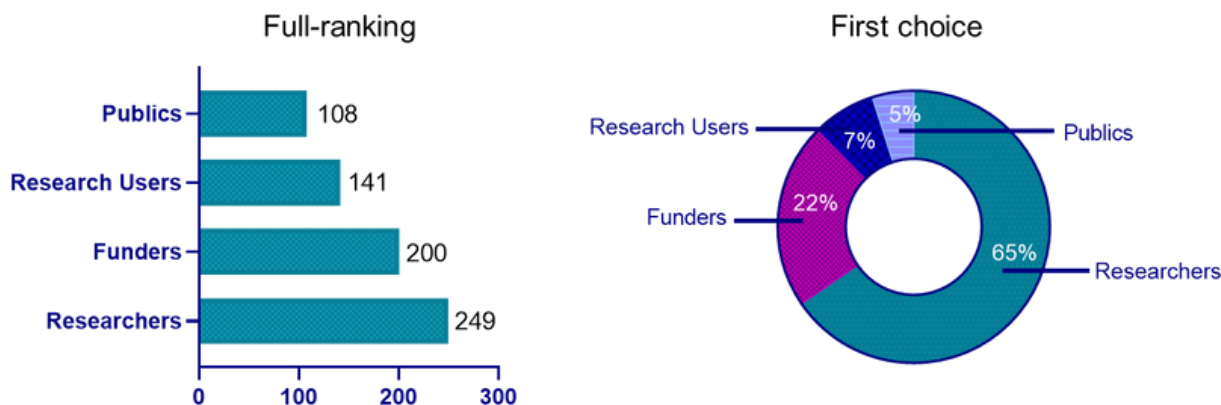
In response to the question:

"Beyond Clock Club meetings: Which broad activities should BioClocks UK organize?"

Each of these broad areas was well supported, in priority order: Resources (data tools, reference data sets, data standards, teaching resources, and shared research facilities); Communication (with funders, researchers, research users, public, etc.); Networking (again, among research and non-research partners); and Training (in public engagement, mentorship, research methods, research culture). Each area had 20-30% support, whether Robert analysed the full rankings or just the first preferences.



"When engaging in communication/liaison activities, who should be the intended recipients?"

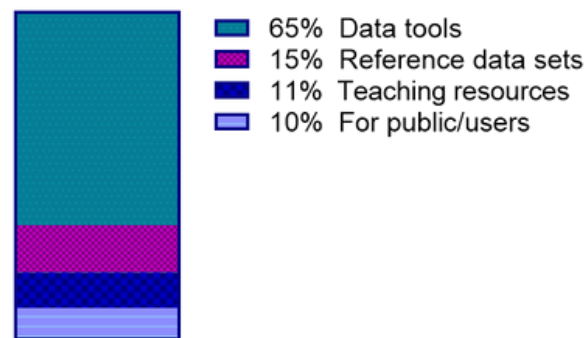


The full ranking showed good support for all BioClocks UK's suggested audiences, with the first-ranked audience (Researchers) only 2.3-fold above the fourth (Public research users, in nature conservation, shift workers, patients and schools). However, the first preference data showed 65% of respondents ranked Researchers first, and only 5% put communicating to the Publics first, with Research Funders in between, and other Research Users (companies, growers, policymakers, and standards bodies) nearly as low as Publics.

Which resources should be provided?

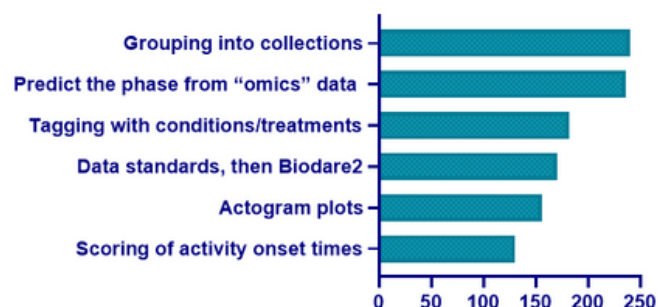
The survey results reveal a clear hierarchy of preferences among respondents when selecting their first choices. The majority of participants strongly prioritize the provision of Data tools and standards, encompassing valuable items such as actograms in BioDare2, damping tools, and the use of DOIs. This underscores a significant emphasis on data-related resources. Following are Reference data sets, including human cohort studies and field studies. Additionally, Teaching resources like slides and practical materials hold a substantial position. Lastly, but closely, respondents also highlight the importance of resources targeting the public and users.

Resources provided?



What data tools or standards should we add to BioDare2 for online data analysis?

What data tools or standards?

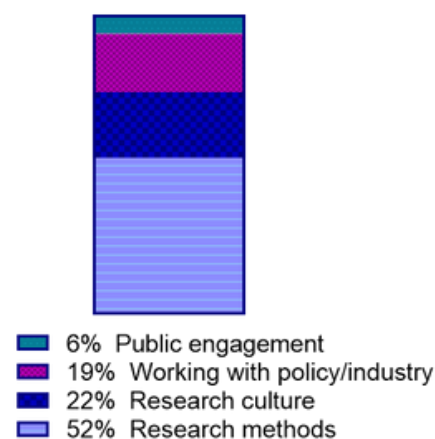


The full-ranking displayed a well-balanced distribution of preferences. Slightly ahead in support was the idea of 'Grouping experiments into collections for sharing and analysis,' followed closely by tools to 'Predict the phase of a sample from "omics" data.' Additionally, respondents highlighted the importance of 'Tagging experiments with conditions/treatments' for effective data grouping and expressed the need for a 'community group to agree on data standards' before integration into BioDare2. Lastly, they emphasized the value of 'Actogram plots' and 'Scoring of activity onset times.'

Training in what?

Respondents prioritized training in key areas: 'research methods' covering statistics, data management, and automation, 'research culture' including peer review, open science, and research integrity, 'working with policy/industry' to connect academic research with external stakeholders. Lastly, participants also expressed interest in training for 'public engagement,' recognizing the value of equipping researchers with skills for effective outreach, public and patient involvement, and the promotion of citizen science initiatives.

Training in what?



Overall, the broad support for BioClocks UK's proposed activities was reassuring. The earliest data informed the objectives of the subsequent BBSRC grant application, along with some of the text comments (links to international 'clock clubs', and a database of PIs, for example). The later, first-preference data showed 'Research-first' responses to several questions. This initially seems natural from a research audience. It's possible that some respondents were reflecting the priorities for their own activities, where BioClocks UK might help. It might be harder to form separate aspirations for BioClocks UK while it is such a new organisation. Its role will evolve, with further iterations and more of your ideas: "consider an art meets chronobiology section", for example.

CREDITS

We extend our heartfelt gratitude to all the individuals whose contributions have made this newsletter possible. Thank you for sharing your expertise, insights, and passion with our readers, enriching their experience with every word and image.

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Andrew Antony Bambos Daniel



Hannah James Malcolm Marissa Nina



Rebecca Robert Rob Tyler

Prof. Antony Dodd, *Newsletter editor*

MSc. Marissa Valdivia-Cabrera, *Newsletter designer and coordinator*

Dr. Nina Rzechorzek, *Creator of BioClocks UK and Clock Club images and logos*

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And our Funder:

