Biotechnology and Biological Sciences Research Council

eastBIO

East of Scotland Bioscience Doctoral Training Partnership

EASTBIO RESEARCH SYMPOSIUM 2024

Reproducibility in Bioscience Research

3RD-4TH JUNE 2024

Medical Sciences Building, School of Medicine
University of St Andrews, North Haugh
KY16 9TF

TABLE OF CONTENTS

CONTENTS

MONDAY 3RD JUNE 2024

10:30 – 11:00	**Registration & Refreshments**		**Foyer**
11:10 – 11:30	**Welcome to Symposium**		**Booth Lecture Theatre**
11:30 – 12:15	**Keynote on Reproducibility in Bioscience Research** *Dr Emma Ganley (protocols.io)*	**EASTBIO Management Group meeting (Meeting Room 2)**	**Booth Lecture Theatre**
12:15 – 13:00	**Interactive Discussion on Reproducibility in Bioscience Research** *Dr Emma Ganley (protocols.io); Prof. Inke Näthke (University of Dundee); Emma Wilson (Reproducibilitea)*		**Booth Lecture Theatre**
13:00 – 14:00	**Lunch** *Group photo opportunity*		**Foyer**
14:00 – 15:00	**Parallel Networking and EDI Sessions** **Supervisor Networking** *Dr Caroline Barelle (Elasmogen)*		**Seminar Room 1**
	Student Film Screening *Coded Bias*		**Physics Lecture Theatre C**
	Student Active Bystander Workshop *Davy Thompson (White Ribbon Scotland)*		**Booth Lecture Theatre**
15:00-16:00	**Poster Presentations** Refreshments available throughout in Foyer		**Exhibition Space**
16:00-17:30	**Student Oral Presentations** Proteomics & Sequencing: Physics Lecture Theatre C Tissue/Cell Culture & Phylogenetic & Imaging: Booth Lecture Theatre Genetics & Ecology & PIPS: Seminar Room 1		**Booth Lecture Theatre/Seminar Room 1/Physics Lecture Theatre C**
17:30	**Close of Day 1**		
18:15-23:30	**Wine reception, Dinner and Ceilidh** Lower College Hall St Salvator's Quadrangle North Street KY16 9AL		**Upper/Lower College Hall**

TUESDAY 4TH JUNE 2024

9:00 – 9:45	**Keynote on Interdisciplinarity and Career Journey** *Professor Dame Melanie Welham (former Executive Chair of BBSRC)*	**Booth Lecture Theatre**
9:45 – 10:30	**Panel Discussion** *Dr David John Hughes (University of St Andrews); Dr Imogen Johnston-Menzies (NHS Scotland); Dr Jessica Powell (Roslin Institute)*	**Booth Lecture Theatre**
10:30 – 11:15	**Creating and Presenting Effective Graphs** *Dr Hannah Woods (Aetos Research)*	**Booth Lecture Theatre**
11:15 – 11:30	**Break**	**Foyer**
11:30 – 12:15	**Grant Writing Session Introduction** *Professor Sam Martin (University of Aberdeen)*	**Booth Lecture Theatre**
12:15 – 13:45	**Lunch and Wellbeing Walk** Student led well-being walk around St Andrews during the lunch break. This inclusive activity is open to all students, supervisors, and staff members.	**Foyer**
13:45-15:15	**Grant Writing Sessions** Tea/coffee available in Foyer 14:45-15:15	**Booth Lecture Theatre/Seminar Room 1/Meeting Room 2/Meeting Room 3/Meeting Room 4**
15:15-16:00	**Grant Writing Session Presentations**	**Booth Lecture Theatre**
16:00-16:30	**Prizes and Close**	**Booth Lecture Theatre**

WELCOME

DR THOMAS OTTO, UNIVERSITY OF ST ANDREWS

A very warm welcome to St Andrews and the 2024 Annual Symposium of the UKRI BBSRC-funded EASTBIO Doctoral Training Partnership!

This year's Symposium, planned by our volunteer student organizers including the student EDI group and our DTP Support Officer, is truly one of the highlights on the EASTBIO calendar. Please join me in extending a thank you to all our organizers for their hard work and commitment in making this event possible.

The Symposium serves as a unique platform, bringing together our four cohorts of PhD students along with distinguished guest speakers and panellists to delve into the critical topic of the reproducibility of bioscience research within the broad range of research conducted across the partnership. We are excited to support our students' skills development through this event and to build connections among our vibrant community of students, supervisors, and guests.

Let's not forget to have a lot of fun while doing so! Have a wonderful day!

Dr Thomas Otto (he/him)

University of St Andrews

IMPORTANT INFORMATION

EMERGENCIES

FIRE ALARM

There is no fire drill expected in the Medical Science Building during our event. If the fire alarm goes off, please leave the building through the nearest exit. The muster point is outside the Gateway building, 100 metres to the north of the Medical Sciences Building.

EMERGENCY CONTACTS

Hazel and Maria are your main points of contact on the day. Hazel can be reached on 07527366767 or by emailing hharop@ed.ac.uk. We will also monitor the bioeng@ed.ac.uk inbox during the two days of the Symposium. There will also be a representative from the venue available on both days.

ARRIVAL

PARKING

There is parking available at the nearby Gateway and Petheram Bridge, and both David Russell Apartments and Agnes Blackadder hall offer free car parking for guests. Find out more about getting to St Andrews.

STORAGE

For those staying overnight, the residences may be able to provide luggage storage after your check-out time. Storage space will also be available at the venue in Meeting Room 1.

REGISTRATION

Registration will take place from 10:30am on the 3rd of June in the foyer of Medical Sciences Building. We understand that some guests may be attending later in the day and so will aim to have someone in this area at all times to provide your name badge.

There will be preferred pronoun stickers available, as well as traffic light cards to indicate whether you wish to be approached by other delegates, with a red card indicating that you wish to be left alone for the time being, and green indicating that you are open to socialising.

If you have your lanyard from the induction or previous symposia events, please bring that along to help us to save waste!

PHOTOGRAPHY CONSENT

There will be a photographer present on 3rd June, capturing sessions and networking activities both to commemorate the event and to be used on the EASTBIO website, for news items by partner institutions, and EASTBIO promotional activities. For further information about Edinburgh University's approach to data protection and your rights go to: https://data-protection.ed.ac.uk/data-protection-policy. If you *do not* wish to be photographed for these purposes, please complete this form https://forms.office.com/e/WgqHFgQE8K and be sure to collect a discreet sticker from the registration desk so that the photographer can identify you.

ACCOMMODATION CHECK-IN

Accommodation will be provided in Agnes Blackadder Hall & David Russell Apartments. Your allocation will be shared with you in the information email, but if you are uncertain, please get in touch with bioeng@ed.ac.uk. All keycards should be returned to the residence reception desk upon check out.

VENUE

TOILETS

There are male, female and accessible toilets available on the main floor of the venue.

ACCESS

The Medical Sciences Building venue is fully accessible and induction loops are installed in all of the main lecture rooms. Please note that Upper College Hall is accessed by 15+ steps, with a handrail on both sides. There are toilet facilities on both floors.

STUDENT REPS

Look out for our student reps helping on the day who will be wearing EastBio t-shirts. We will do our best to have someone available at the registration desk throughout the event if you have any questions, either for the event or related to EASTBIO more generally.

WI-FI

Wifi can be accessed via Eduroam or BT Openzone. Students will be encouraged to use reference materials in the grant-writing session and so are welcome to bring a laptop or tablet if you wish.

WELLBEING

SAFE SPACES AND QUIET ROOM

We want the Symposium to be as accessible, safe and inclusive as possible. If you need some space away from other delegates, you are welcome to use Meeting Room 1, and any other empty meeting rooms as a quiet room. Please note that student reps may come in and out of this room every so often, but it will be less busy that the rest of the venue.

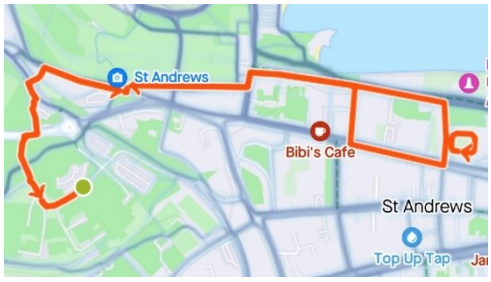
Mental Health First Aiders will be around throughout the event. If you would like to talk to someone, please either approach one of the MHFA who will be introduced at the beginning of the symposium or speak to Maria or Hazel (both MH First Aiders) at any point during the day.

TRAFFIC LIGHT CARDS

In your lanyard pack you can find 2 ‘traffic light’ cards. You can use these to indicate whether you wish to interact with other delegates. If you are happy to be approached by others, you can display the green card; if you are feeling less chatty at any time, you can display the red card. Please be aware of other people’s traffic light colour.

WELLBEING WALK

A 45-50min walk around St Andrews, taking in parts of the world-famous Old Course, views over the West Links, and an opportunity to see the University of St Andrews’ iconic St Salvator’s Quad. Use this walk as an opportunity to chat with new people and enjoy yourself!



FEEDBACK AND COMPLAINTS

There will be a feedback box at the registration desk where you can post feedback which will be considered as the event goes on. There is also a QR code linking to an anonymous feedback form should you feel more comfortable using this; this form can also be found here: https://forms.office.com/e/0ECKMWKczG and be used to submit feedback after the event. Any immediate concerns or verbal complaints on the day can be directed to Maria or Hazel at any point, especially if a response by the team is necessary.

KEYNOTE – REPRODUCIBILITY IN BIOSCIENCE RESEARCH

DR EMMA GANLEY, PROTOCOLS.IO

Keynote address by Dr Emma Ganley discussing her career in science and establishing the significance of reproducibility in bioscience research. This address will discuss the importance of publishing and sharing data and experimental protocols on scientific integrity and research impact.

BIOGRAPHY

Emma began her scientific career studying for a PhD in molecular biology at the MRC-LMB research institute in Cambridge, graduating in 2002 and moving to do a postdoc in California at UC Berkeley. Emma then decided to move into scientific publishing, initially joining PLOS Biology in 2005. In 2007 she took the position of Executive Editor of the Journal of Cell Biology (JCB) in New York. During this time, she gained an enthusiasm for open data, and worked with developers to launch the JCB DataViewer as a tool for making original image data available with published research articles.

After relocating back to the UK and working at the University of Dundee for a couple of years, Emma re-joined PLOS Biology from 2011 until 2019 where she advanced to the position of Chief Editor. Since 2020 Emma has been the Director of Strategic Initiatives at protocols.io, where she has been promoting a more open and reproducible research landscape. Emma is passionate about open research, sharing data and code, method availability, and reproducibility in bioscience.

INTERACTIVE DISCUSSION ON REPRODUCIBILITY IN BIOSCIENCE RESEARCH

An interactive session with guest speakers and the audience involving a broad discussion of key topics spanning the reproducibility of bioscience research, including: the role and future of artificial intelligence tools in academic research (e.g. ChatGPT); open access publishing; reproducing experimental results and protocols, and encouraging engagement in reproducibility.

PANELLISTS:

DR EMMA GANLEY, PROTOCOLS.IO

Emma began her scientific career studying for a PhD in molecular biology at the MRC-LMB research institute in Cambridge, graduating in 2002 and moving to do a postdoc in California at UC Berkeley. Emma then decided to move into scientific publishing, initially joining PLOS Biology in 2005. In 2007 she took the position of Executive Editor of the Journal of Cell Biology (JCB) in New York. During this time, she gained an enthusiasm for open data, and worked with developers to launch the JCB DataViewer as a tool for making original image data available with published research articles.

After relocating back to the UK and working at the University of Dundee for a couple of years, Emma re-joined PLOS Biology from 2011 until 2019 where she advanced to the position of Chief Editor. Since 2020 Emma has been the Director of Strategic Initiatives at protocols.io, where she has been promoting a more open and reproducible research landscape. Emma is passionate about open research, sharing data and code, method availability, and reproducibility in bioscience.

PROF. INKE NATHKE, UNIVERSITY OF DUNDEE

Inke Näthke is the Associate Dean for Professional Culture and Professor of Epithelial Biology at the School of Life Sciences, Dundee. Her responsibilities include fostering a positive research culture, promoting academic best practices, overseeing staff career development, and leading equality, diversity, inclusion and research integrity efforts.

In 1991, Inke completed her PhD at the University of California, San Francisco. She then undertook postdoctoral fellowships at Stanford University and Harvard Medical School. In 1998, she relocated to Dundee and founded her research laboratory.

Inke is also a Trustee of UK RIO, an “independent charity that offers support to the public, researchers, and organisations to further good practice in academic, scientific, and medical research,” and the Co-Chair and founding member of the Scottish Research Integrity Network.

EMMA WILSON, REPRODUCIBILITEA

Emma is a PhD student in the CAMARADES Research Group at the University of Edinburgh, specialising in meta-research and evidence synthesis. Since 2022, she has been the co-organiser for the Edinburgh ReprodicibiliTea journal club, a grassroots initiative that helps researchers discuss diverse issues, papers and ideas about improving science, reproducibility and the Open Science movement.

She is also part of the Edinburgh Open Research Initiative, and has helped develop training materials for the UK Reproducibility Network. The initiative "Open Research in the Classroom", of which she is project lead, aims to introduce high school and undergraduate students to the importance of open and reproducible research, and she is passionate about science communication and engagement.

SESSION CHAIRS: ROSIE GALLAGHER; ANDREW NICOLL; ALI SOMERVILLE

NETWORKING EVENTS

SUPERVISOR NETWORKING

This event was designed to promote collaboration between EastBio supervisors and external partners. In this light, we will present the newly released EastBio Research in Life Sciences Directory 2024, describing the field and expertise of supervisors in the four DTP cohorts.

DR CAROLINE BARELLE

Our guest speaker, Caroline Barelle (CEO of Elasmogen) will go over the many advantages of academic institutions cooperating with industry and detail the different possible types of partnerships. Caroline will then go over the challenges that can occur and how to surpass them.

To conclude this section, we would like to offer the chance to all the delegates to interact on the topic of collaboration. We will form small groups discussing various aspects and challenges that arise from research collaboration, whether between academics or at the interface with industry. The teams will be reshuffled to create a dynamic conversation where everyone can voice their opinion and engage with delegates from different backgrounds and institutions. We will investigate your views on topics such as:

- What kind of expertise that your lab does not currently have would improve your research output?
- How would you go about collaboration over a commercial-able result?

SESSION CHAIRS: MARTA CHRONOWSKA; ÉMILIEN KREMPF

FILM DISCUSSION: CODED BIAS

This session will be an informal discussion about the topics covered in *Coded Bias* (2020), a documentary that explores issues of bias in artificial technology. You can watch the film beforehand on Netflix, but we will also provide supplementary information and view the trailer as part of the discussion. If you would like a copy of the information and suggested discussion points ahead of the session, please email Sajan McCorkindale (s.mccorkindale.23@abdn.ac.uk).

Film Abstract

Coded Bias follows Joy Buolamwini, a researcher at MIT who discovered that facial recognition algorithms could only detect her face when she wore a white mask. This prompted her to start exploring other ways in which artificial intelligence is influenced by and affects marginalised groups in our society.

Alongside considering the underlying factors that lead to bias in AI, the film also looks at real world examples of how the bias in AI models has negatively affected people, and how it helps to enforce an inequitable status quo.

The film also explores instances of misuse of AI by corporations and governments, underlining the lack of transparency and accountability in these cases. It discusses the lack of legal frameworks around the use of AI, how those negatively affected by it lack any form of recourse, and how it is primarily used by people with more socioeconomic power on those with less.

The film ends with a message on the importance of collaboration and the need to work together to ensure that AI is used in a way that is fair and both it and the people who use it are held accountable both legally and ethically.

SESSION CHAIR: SAJAN MCCORKINDALE

ACTIVE BYSTANDER WORKSHOP

DAVY THOMPSON, WHITE RIBBON SCOTLAND

TW: Gender-Based Violence, SA, Sexism

We are all bystanders to the everyday events that unfold around us. At times, we may witness situations where someone is in danger or being subjected to unacceptable behaviour. In such moments, we face a choice: to remain passive or to become active bystanders. By intervening, we send a clear message to the perpetrator that their actions are not acceptable. Consistent and reinforced intervention can help redefine social norms, ultimately stamping out problem behaviour.

Recognizing when someone is in danger and understanding how to safely intervene are crucial skills. Safe intervention methods can vary widely, from simply giving a disapproving look or interrupting the situation to providing support to a friend who has experienced problematic behaviour, among other strategies.

The White Ribbon Campaign, which originated in Ontario, Canada in 1991, has since expanded to over 60 countries. It advocates for healthier relationships, gender equality, and a more compassionate understanding of masculinity. This workshop aims to educate participants on effective methods and practices of being active bystanders. It is relevant and applicable to everyone in society, as we all have a role to play in creating safer and more respectful communities.

SESSION CHAIRS: JACK HORNE; AMELIA NEWTON

POSTER PRESENTATIONS

Student poster presentations displaying their research, work undertaken during their PIPS and CASE placements, and how they incorporate reproducibility in their work.

The main poster session will take place in the exhibition space. Due to the large volume of posters, this session is split in two. From 3-3:30pm, half of the presenting students will be asked to stay near their posters and present, the other half are free to view the posters. At 3:30pm the two groups will swap over and those presenting in the first half will be free to view posters, and those viewing in the first half will be asked to stay near their poster to present for the remaining 30mins.

Students who prefer to present their posters in a quieter environment will be presenting in a meeting room, away from the main poster area.

All students are free and encouraged to view the posters in this room; however, we ask you to please be considerate and aware that this room is meant to be quieter than the main poster area. There will be seating available in this room also.

You can find the abstract for each presentation here:
https://drive.google.com/file/d/1t1Vi7cZZhSoBG0LeAymQXvO09yAvk2i9/view?usp=sharing

SESSION CHAIRS: EMILY FIELDS, JACK HORNE, EMILE MENSIKOVA, ANDREW NICOLL, YUXIN SHEN, CHUMENG ZHU

STUDENT PRESENTATIONS

You can find the abstract for each presentation here:
https://drive.google.com/file/d/1t1Vi7cZZhSoBG0LeAymQXvO09yAvk2i9/view?usp=sharing

PROTEOMICS & SEQUENCING: PHYSICS LECTURE THEATRE C

PRESENTERS:

Sofia Ratgauzer (University of Edinburgh) - Intrinsically Disordered Regions in Mouse Embryonic Stem Cell Self-renewal.

Maheshika Sandaruwanie Kurukulasuriya (University of Aberdeen) - Inhibitors of Gene Expression to Treat Parasitic Nematode Infections.

Kate Dubarry (University of Edinburgh) - Insights into the transcriptome of sheep circulating immune cells using single-nuclei RNA-sequencing.

Camilo Munoz Schuler (University of Aberdeen) - Molluscan haematopoiesis and the evolution of biomineralization.

Talal Hossain (University of Edinburgh) - Biological modelling and AI in designing phage cocktails for UTI.

Cristina Ponce Lilly (University of Edinburgh) - Improving CRISPR-Cas9 mediated precision gene editing in microalgae.

SESSION CHAIRS: JACK HORNE; CHUMENG ZHU

TISSUE/CELL CULTURE & PHYLOGENETIC & IMAGING: BOOTH LECTURE THEATRE

PRESENTERS:

Alex Reiss (University of Edinburgh) - Global patterns in the evolution of host-plant interactions of gall wasps on oaks.

Muhammad Zaman Khan Assir (University of Aberdeen) - Interleukin-17A mediated effects of maternal inflammation on the human cortical development.

Raffee Wright (University of Edinburgh) - Exploring the relationship between Notochord Progenitors and Neuromesodermal Progenitors in vitro.

Lucy Turnbull (University of Edinburgh) - Building a Genomic and Molecular Toolkit in Begonia to Investigate Gene Duplication's impact on Leaf Shape.

William Smith (University of St Andrews) - Octopaminergic modulation of motor program selection in the Drosophila larval locomotor system.

Emma Dumble (University of Edinburgh) - Investigating how the remodelling of axonal pre-synapses is governed by oligodendrocyte precursor cells in the zebrafish visual system.

Christoph Wagner (University of Edinburgh) - Machines building machines – the perpetual self-regeneration of life.

SESSION CHAIRS: EMILY FIELDS; ANDREW NICOLL

GENETICS & ECOLOGY & PIPS: SEMINAR ROOM 1

PRESENTERS:

Abbygail Wells (University of Edinburgh/SRUC) - Understanding molecular variations of the cattle genome by machine learning.

Alasdair Iredale (University of Dundee) - Your Best Face Forward - How cereals regulate their epidermal surfaces.

Bethany Bridge (University of Aberdeen/SRUC) - Bats, bioacoustics and bias.

Li Veiros (University of St Andrews) - Conceptual replication of predator inspection experiments.

Steven McPherson (University of Aberdeen) - Monoclonal antibodies targeting the fungal cell surface: next generation antifungal therapeutics.

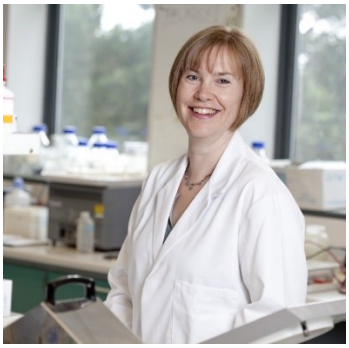
Emma Hardy (University of Dundee/James Hutton Institute) - Deciphering the role of translation in temperature-controlled development.

Carys Redman-White (University of Edinburgh) - Public Affairs and Sustainability in the Veterinary Pharmaceutical Industry.

SESSION CHAIRS: YUXIN SHEN; EMILE MENSIKOVA

KEYNOTE – REFLECTIONS ON CAREER DIVERSITY

DR MELANIE WELLHAM, INDEPENDENT TRUSTEE, BRISTOL UNIVERSITY & ROYAL SOCIETY OF BIOLOGY & FORMER EXEC CHAIR, BBSRC



Professor Dame Melanie Joanne Welham DBE is a renowned biochemist celebrated for her substantial contributions to molecular signalling and stem cell science, as well as her leadership in the biotechnology and biological sciences research community.

Welham began her academic career in Biochemistry at Imperial College, London, where only 15% of the undergraduate cohort were women. She then pursued her PhD at University College London, where she focused on cancer cell biology. After completing her doctoral studies, she conducted post-doctoral research at The Biomedical Research Centre at the University of British Columbia in Vancouver, Canada.

In her academic career, Welham joined the University of Bath as a lecturer in the Department of Pharmacy and Pharmacology. She made history as the first woman to be appointed professor in the department's 97-year history. During her time at Bath, her research primarily cantered on molecular signalling and stem cell science. She also served as Co-Director of the University's Centre for Regenerative Medicine for four years, furthering her impact on the field.

In 2012, Welham was appointed Executive Director of Science at the Biotechnology and Biological Sciences Research Council (BBSRC), the UK's largest public funder of non-medical biological research and EastBio's funding body. From April 2018 to June 2023, she served as the Executive Chair of BBSRC, which is now part of UK Research and Innovation. In these roles, she played a crucial part in shaping the direction and funding of biological research in the UK.

Throughout her career, Welham has been a vigorous advocate for equality, diversity, and inclusion, assuming leadership roles and engaging in numerous activities to promote these values. She is currently a Member of the Board of Trustees of the Human Frontiers Science Program Organisation, a Member of the Governing Board for Science Europe, and a member of the Global BioData Alliance Board. In recognition of her services to the biosciences, she was awarded a DBE in the 2023 Birthday Honours. Additionally, she serves as the UKRI Executive Champion for People, Culture, and Talent, continuing her advocacy for a more inclusive and supportive research environment.

SESSION CHAIRS: ALICE CATANZARO; SAJAN MCCORKINDALE; SUJITH SURENDRANATH

PANEL DISCUSSION

CAREER CHOICES, CAREER PROGRESSION, AND ADVICE FOR EARLY CAREER RESEARCHERS

The panellists, including former EastBio students and a member of our supervisory community, will join us to talk about their career transitions and progression after completing their PhD research. The aim of the session is to provide diverse insights to current students about personal identities and ambitions, resilience and coping strategies, and enhance their understanding of professional and personal lives.

PANELLISTS:

DAVID JOHN HUGHES, UNIVERSITY OF ST ANDREWS

After completing my PhD in 2006, I worked as a postdoctoral fellow both in the USA and UK. I was then appointed as an independent research fellow (2014) and later lecturer (2018) at the University of St Andrews. As a molecular virologist, my research aims to understand the interplay between viral infection and our immediate (innate) immune response. We are also translating this knowledge into new tools and therapeutics.

IMOGEN JOHNSTON-MENZIES, NHS GREATER GLASGOW AND CLYDE

After finishing my EASTBIO funded PhD at the Roslin Institute in 2021 where I studied host-adaptation in Salmonella enterica serovars, I began a three-year Clinical Scientist training program in clinical microbiology based in NHS Greater Glasgow and Clyde. I will complete my training in September of 2024, aiming to become a Clinical Scientist registered with the Health and Care Professions Council.

JESS POWELL, ROSLIN INSTITUTE

I was an EastBio PhD student (2016 intake) at the Roslin Institute studying the epigenome of cattle immune cells. After finishing my PhD in 2021, I did a 2-year postdoc at The University of Cambridge and then I returned to Edinburgh last year for a second postdoc back at The Roslin Institute.

SESSION CHAIRS: SUJITH SURENDRANATH; CHUMENG ZHU

VISUALISING DATA: CREATING AND PRESENTING EFFECTIVE GRAPHS

DR HANNAH WOODS

Hannah is an ecologist with particular expertise in plant and insect ecology. She holds a first-class honours degree in Zoology from the University of Dundee, and completed her doctoral research at the James Hutton Institute, using molecular biology techniques to understand the complex relationships between aphids and the parasitic wasps that attack them in the field.

In addition to working with the Biodiversity Futures Initiative to establish independent peer-review of claims of biodiversity gain in the emerging biodiversity credit market, Hannah is part of a small team at Aetos Research who provide training in statistical analysis of biological data to those working in ecological consultancy, as well as to early years researchers across a range of life sciences disciplines. She is experienced in the statistical modelling of ecological and environmental data using the R language, including the visual exploration and presentation of data using the graphics utility ggplot2, and the use of R Markdown and Quarto to produce publication standard reports.

GRAPH SESSION DESCRIPTION:

This workshop focuses on creating accessible graphs that foster clear communication of your research findings, with a focus on creating graphs in R. In academia, the ability to present data visually in an accessible and reproducible manner is crucial. This workshop aims to equip you with the skills to create graphs that not only show your results, but do so in a way that is understandable to a diverse audience. It will cover practical tips, best practices and tools that will allow you to present your data effectively. Join us to elevate your graph-making proficiency!

SESSION CHAIRS: ALICE CATANZARO; EMILY FIELDS; EMILE MENSIKOVA

GRANT WRITING AND PROBLEM SOLVING

PROFESSOR SAMUEL MARTIN (UNIVERSITY OF ABERDEEN)

Professor Samuel Martin from the University of Aberdeen will host the workshop, which will aim to cover the essentials for a successful grant application.

The workshop will be followed by the hands-on competition, where you will be divided into teams of 4 or 5 and then placed into the different BBSRC thematic areas. Each thematic area will be facilitated by a staff and student coordinator. In your group, you will be expected - over the course of an hour - to develop a framework of a research grant idea based on one of the thematic groups you have been allocated to. Each group will then present their ideas to the group and the two facilitators, where you will have the opportunity to be assessed by your peers and the facilitators. The winners of each group will then progress to the final, which will be judged by a panel in the main auditorium. Group assignments will be random; your group is in the attached file. On the event day, there will be signposts with your group and team allocation, alongside which room will host each thematic group.

We request that students **bring a laptop** for the presentation and any potential research required during the workshop.

TIME ALLOCATION AND WRITING GUIDANCE FOR YOUR GRANT PROPOSAL (SESSION 2, 13:45 – 15:15)

The following details are guidelines on what we would like to see in each section, and how long each should last. These are only guidelines so each team may adjust the times as they see fit. We recommend that each team nominates a speaker at the start to avoid pre-presentation rush. We expect a 2-minute elevator pitch at the end of the session, which will be graded for the competition.

Project Title (15 minutes)

We would like to see a project title that is relevant to the thematic area. The title should be clear and concise and provide a good understanding of the purpose and scope of the project title.

Tips:

- Choose words that clearly convey the focus and objectives of the project.
- Include key elements such as the main goal, or specific outcomes.

Project Objectives (15-30 minutes)

We would like to see each team produce between 3-4 objectives that outline the main scope of the project. These should ideally be short and concise, and no more than 1 to 2 lines approximately.

Tips:

- Try to highlight the key elements of your project. State the objectives in terms of outcomes, rather than the process.
- Link the objectives back to the title, or vice-versa, and keep them relevant to the research theme.

Knowledge Gap and Impact (15 minutes)

We would like to hear a summary of the knowledge gap that your proposal would aim to fill. With this, we would like to hear a summary of the impact your proposal will have, with further consideration as to who the stakeholders would be.

Produce 1-2 Slides (15 minutes)

We anticipate that you should spend 15 minutes crafting a summary slide of all the points above. Ideally, your pitch should be condensed down to a single slide. Ideally, the slide will act as a platform for you to explain your ideas, but also provide enough information to explain the scope of your proposal for anyone who is only reading the slide.

SESSION CHAIRS: MARTA CHRONOWSKA; ROSIE GALLAGHER; JACK HORNE

GRANT WRITING AND PROBLEM SOLVING GROUPS

SESSION 1: LIVESTOCK AND AQUACULTURE

ROOM: BOOTH LECTURE THEATRE

STAFF FACILITATOR: PROF SAM MARTIN

SESSION CHAIR: MAX CHARLES VALLARINO

Group 1	Group 2	Group 3	Group 4	Group 5
Abbygail Wells	Sarah Dagen	Rob Stewart	Louise Cope	Talal Hossain
Suzanne Drennan	Ananya Hoque	Jack Henderson	Gabriele Bagusinskaite	Eilidh Geddes
Lorenzo Croce	Valentina Giai	Douglass Freeburn	Gabriella Crawford	Amy Newell
Li Veiros	Muhammad Zaman Khan Assir	William Smith	Tamsin Woodman	Rose Parsa
Steven McPherson	Maria Roxana	Michaela Ristova	Phoebe Beal	

SESSION 2: CLEAN GROWTH

ROOM: SEMINAR ROOM 1

STAFF FACILITATOR: DR GERAINT THOMAS

SESSION CHAIR: MARTA CHRONOWSKA

Group 1	Group 2	Group 3	Group 4	Group 5
Brendon Medley	Kitty Clouston	Michael Astbury	Simon Harnqvist	Arianna Schneier
Chak Lam Chan	Louisa Kosin	Camilo Munoz Schuler	Maheshika Sandaruwanie Kurukulasuriya	Eileen Clemens
Raffee Wright	Charlotte Winspear	Bibianna Zirra-Shallangwa	Maria Juliana Rodriguez Cobillos	Eleanor Birch
Sophie Winterbourne	Rachel Martin	Carys Redman-White	Broc Drury	Emily Fields
Max Hayhurst	Karen Keegan	Emile Mensikova	Temitayo Ademolue	Andy Nordqvist

SESSION 3: RULES OF LIFE

ROOM: MEETING ROOM 2

STAFF FACILITATOR: DR HELDER FERREIRA

SESSION CHAIR: CRISTINA PONCE LILLY

Group 1	Group 2	Group 3	Group 4	Group 5
Qifan (Leo) Yin	Alistair Bonsall	Jed Hawes	Javier Sánchez Utgés	Elena Hartmann
Rebecca Bryce	Kate Dubarry	Thomas Lawson	Ishana Sood	Amelia Newton
Emma Hardy	Chemeng Zhu	Emma Dumble	Alexander Dindial	Alice Catanzaro
Sofia Ratgauzer	Alasdair Iredale	Taylor McCarthy	Kate Smith	Melanie Podbielski
Jessica Matthews	Martyna Kasprzyk	Erin Watson		

SESSION 4: CROPS AND SOIL

ROOM: MEETING ROOM 3

STAFF FACILITATOR: DR EMILIE HOLLVILLE

SESSION CHAIR: JACK HORNE

Group 1	Group 2	Group 3	Group 4	Group 5
Louise Goossens	Sujith Surendranath	Emily Cope	Angus Comerford	Yuxin Shen
Louise Goossens	Alex Reiss	Peyton Goddard	Alexander Edwards	Christoph Wagner
Barbara de Queiroz Monteiro Black	Isolde Marsland	Barbora Illithova	Kaia Waxenberg	Mariam D'Ippolito
Haya Al Siyabi	Sam Bankole	Michael Simmonds	Inés Jiménez Pulido	Emilien Krempf
Katie Arnton	Shannon Richardson	Zhouen Lu	Anastasia Ellis	Lucy Turnbull

SESSION 5: HEALTH

ROOM: MEETING ROOM 4

STAFF FACILITATOR: DR PAOLO ANNIBALE

SESSION CHAIR: ROSIE GALLAGHER

Group 1	Group 2	Group 3	Group 4	Group 5
Bethany Bridge	**Richard Edel**	**Aitana de la Cuadra Baste**	**Thomas Ballinger**	**Flora Caldwell**
Abdelazeem Elhabyan	**Sajan McCorkindale**	**Hannah Peaty**	**Tesni Houlston**	**Alex Backler**
James Fennell	**Emma Irving**	**Emily Robertshaw**	**Andreas Holmqvist**	**Andrew Nicoll**
Robyn Greene	**Alastair Somerville**	**Meg Watt**	**Emma Armstrong**	**Sandra Maria Sajan**
Anett Ladanyi	**Thomas Smith-Zaitlik**	**Alice Buckner**	**Marina Hamaia**	**Mariya Shtumpf**

CONCLUSIONS AND ACKNOWLEDGEMENTS

The EASTBIO team has overseen and supported the planning of another Bioscience Research Symposium that brings together a number of subject-specific funded PhD projects around the focus topic of Reproducibility.

EASTBIO first- and second-year Student Representatives on the Planning Committee have coordinated discussions that have led to the schedule presented in this resource and that we very much hope that everyone will engage in and benefit from: primarily, the keynote and panel discussion by guest speakers, on the one hand and student presentations with emphasis on methods and reproducibility, both oral and in poster format, on the other. The schedule embodies the partnership's long-lasting emphasis on interdisciplinarity, career transitions and skills by offering both talks, group discussions and workshops for delegates. The third focus - wellbeing – is catered for by student-led initiatives that embrace training, critical interactions and social activities. Throughout the programme, our Planning Committee has worked hard to ensure that diverse shareholders' views will be presented and engagement will be suitable to objectives and requirements, whether supervisors seeking to network for future project-development and industry know-how or EASTBIO alumni/alumnae. EASTBIO extends warm thanks to our Planning Committee for shaping this key event, Support Officer Hazel Harrop for her tireless and cheery support and to the members of the EDI and Training & Development Committees for their ideas and steering.

Dr Maria Filippakopoulou (she/her)

EASTBIO DTP Manager

EASTBIO STUDENT REP ORGANISERS

Many thanks to our student reps who worked so hard to organise this symposium.

Alice Catanzaro (University of Edinburgh)

Marta Chronowska (University of Edinburgh)

Emily Fields (University of Dundee)

Rosie Gallagher (University of Dundee)

Jack Horne (University of Aberdeen)

Emilien Krempf (University of Edinburgh)

Sajan McCorkindale (University of Aberdeen)

Emile Mensikova (University of Aberdeen)

Amelia Newton (University of St Andrews)

Andrew Nicoll (University of Edinburgh)

Cristina Ponce Lilly (University of Edinburgh)

Yuxin Shen (University of Edinburgh)

Ali Somerville (University of Edinburgh)

Sujuth Surendranath (University of St Andrews)

Max Charles Vallarino (University of Aberdeen)

Chumeng Zhu (University of Edinburgh)

DELEGATE PROFILES

We asked delegates to answer one of 3 questions relating to reproducibility in Bioscience, and have grouped delegate profiles based on their answers below.

PLEASE DESCRIBE BRIEFLY HOW YOU ENHANCE THE REPRODUCIBILITY OF YOUR OWN WORK.

PAOLO ANNIBALE

He/Him

Supervisor, University of St Andrews

Microscopy | Fluorescence | Receptors | Cell Signaling

Using open access journals and rigorous data management can enhance reproducibility.

MICHAEL ASTBURY

He/Him

PhD Student, University of Edinburgh

SynBio | Cyanobacteria | Photosynthesis | Metabolism

Sharing raw data and extensive experimental protocols will definitely help improve reproducibility, but I think there needs to be an acceptance that biology can't be as reproducible as the physical sciences. There are so many factors, which can be increasingly costly to control (state-of-the-art incubators, expensive reagents, etc.). If expectations are too high, scientists outside of the most funded universities in MEDCs could be priced out.

GABRIELE BAGUSINSKAITE

She/Her

PhD Student, University of Edinburgh

MRSA | RNA-binding proteins | Bacterial adaptation

The reproducibility of any research work is key as it ensures the quality, reliability and usability of scientific research. Our lab publishes its work in open-access journals and is open to share and discuss the data with other researchers in the field. We store our data, analyses and experimental protocols/notes on openBIS server and benchling which allow easy access and traceability of our work within the lab.

SAM BANKOLE

He/Him

PhD Student, University of Edinburgh

Immunology | Macrophages | Lung | Health & disease

1) I have my bioinfomatics code in a legible format, going through the stages of my work so others can follow for similar analysis. I use open-source bioinformatics tools and I plan to publish my code online on github. 2) I think AI will enhance reproducibility in the future with the exception for it being used to alter images. In terms of coding and writing methodologies, I think it could be used to help standardize practices across research groups. This would be better than the current situation where people do things their own way.

KITTY CLOUSTON

She/Her

PhD Student, University of Edinburgh

Biotechnology | Biocatalysis | Synthetic biology | Sustainability

I think reproducibility is critical to drawing reliable conclusions from scientific data, both in my own work and my field more broadly. This is a challenge in biology, where results are affected by a complex interplay of factors. Strong experimental design, sharing of data and resources and implementing more standardisation in tools and methods across the discipline helps reduce unnecessary variability and improve reproducibility, thus strengthening the integrity of results and advancing our knowledge base.

GABRIELLA CRAWFORD

She/Her

PhD Student, University of Aberdeen

Neurodevelopment | Brain organoids | Microglia | Co-Culture

To enhance the reproducibility of my research, I plan to do extensive internal validation of my findings, through the use of single cell RNA sequencing and phenotyping, using primary human tissue as a comparative control. In the long-term, I hope to publish my research in relevant journals that would

allow for the sharing of knowledge and the opportunity for experiments to be repeated and compared. I aim to be systematic in my approach to answering my research questions and to be entirely transparent about all results observed, by submitting all data to public repositories, following reporting guidelines for methodology in publications and using appropriate controls throughout to provide the most reliable and reproducible conclusions.

ANDREW DESBOIS

He/Him

EASTBIO Management Group, University of Stirling

Aquaculture | Microbiology | Antimicrobial Resistance | Vaccines

1) In published work, I spend time to provide thorough descriptions of my materials and methods, and make use of Supplementary Materials to provide datasets. I submit data to online open-access repositories, e.g. GenBank. Prior to publication, I aim to try to repeat experiments or parts of experiments and a different investigator in the group to do this. 2) I have no idea how AI will impact reproducibility - hopefully beneficially through providing means for validation. 3) There is a crisis in this, driven in part by publish or perish, poor culture in (many) research labs & institutions, and 'lack' of funding for - or difficulty in justifying - independent validation of observations.

ANASTASIA ELLIS

She/Her

PhD Student, University of St Andrews

ParaHox gene regulation in the chordates

Thorough documents protocols (one for publication and one for actual use) to be sent if people ask for it. Secondly, I think AI will be a vital tool in highlighting alternative avenues, the day-to-day "boring" tests of reproducibility, as well as general sense-checking but I don't think it will ever truly take over the creative side of research. Thirdly, yes - so many stories have recently come out about repeated experiments failing and the false data out there.

DOUGLAS FREEBURN

He/Him

PhD Student, University of Dundee/JHI

Transcriptomics using nanopore sequencing

The main focus of my work is developing and publishing pipelines for accurate analysis of Nanopore sequence data. This involves adapting existing tools, and developing novel tools and methods to enhance the quality of the sequences produced from raw Nanopore sequence reads, which in turn improves the accuracy of biological inferences made from Nanopore sequence data. I am focusing on the transcriptomics side, with the goal of improving transcript annotation accuracy in barley.

PEYTON GODDARD

PhD Student, University of Dundee

Parasitology | Cryptosporidium | Genetics

My project aims to pick apart host-pathogen interaction of Cryptosporidium parvum in cows. Reproducibility is incredibly important as my work aims to lay the foundation upon which future research will be built. Being reproducible solidifies trust and reliability in scientific work and methods and this is extremely important when my work can empower and inform future studies.

EMMA HARDY

She/Her

PhD Student, University of Dundee

Plant Science | Translation | RNA biology

The reproducibility of my work is difficult, as much of wet lab work that requires trust that it is done correctly. However, all data that I collect is available, both the "raw" data (including full size gel images, pictures of plant growth, etc.), and "finished" data, and both can be easily found and compared. I think AI could potentially lead to problems with AI generated images of experiments. However, perhaps AI can also be used to identify falsified images. I think there is a reproducibility crisis, but this might stem in part from stress put on scientists to publish and to have results quickly.

JACK HORNE

He/Him

PhD Student, University of Aberdeen/SRUC

Functional Genes | Nutrient Dynamics | Soil Health | Agriculture | EDI

I record every step of my analysis, including the time that samples were removed and returned to storage. I aim to publish and store my data in accessible media, and our push in SRUC is to publish in exclusively open access journals. All mistakes are reported and every step in the statistical validation of models is labelled and recorded in either an accessible lab notebook, or is directly integrated into the R code so each step is clearly followable.

LOUISA KOSIN

She/Her

PhD Student, University of Edinburgh

Animal behaviour | Animal welfare | Photoreception | Non-visual opsins | Circadian rhythm

Ideally, I would like to publish my work in open access journals (e.g., Animal Behaviour) and share my data to make it accessible for everyone who is interested in my research. Reflecting on my own project, I feel the most helpful measure would be sharing the raw data and detailed methodologies across researchers.

EMILIEN KREMPF

PhD Student, University of Edinburgh

Chromatin | Plant | Immunology | Ubiquitin

1) I am always on the lookout to remove any bias I could have in both selecting my data point but also during the protocols. 2) AI could help spot plagiarism or photoshopped western or microscopy images. 3) A significant portion of the literature is not reproducible so the reality of a crisis is obvious to me; this is even more so in science, when the biologicals systems are partly based on randomness to begin with.

CHIARA MANIACI

She/Her

Supervisor, University of Dundee

Protein processing | Protein post translational modifications

Through publishing in open access journals, data sharing and data accessibility, creating online repositories for raw data/code, independent validation of results, transparent reporting of results, thoroughly documenting experimental protocols.

SANDRA MARIA SAJAN

She/Her

PhD Student, University of Aberdeen

Neurodevelopment | Synaptic plasticity | Long term depression | Caspase-3

During my PhD, I'll utilize cellular models and molecular biology tools, including primary neuronal cultures, confocal microscopy, transfections, western blotting, immunoprecipitation and CRISPR screening. The novelty of my research lies in the ingenious application of these techniques to address unique scientific hypotheses. To ensure reproducibility, I strictly adhere to standardized protocols, meticulously document experiments, and prioritize clear communication of methodologies. I advocate for research accessibility and aim to publish my research outcomes in open-access journals. While Artificial Intelligence holds great promise in automating tasks and minimizing errors, I strongly believe that the looming reproducibility crisis in bioscience, stemming from complex biological systems and methodological shortcomings, requires concerted efforts, including replication studies and transparent reporting, to enhance the reliability of scientific research and innovations.

ISOLDE MARSLAND

She/Her

PhD Student, University of Edinburgh

Enhancing the reproducibility of scientific work is crucial to ensure the reliability of research findings, as well as providing confidence in the validity of the

results. At this early stage of my PhD, I mainly ensure detailed documentation of my experimental protocols, allowing others to replicate my experiments accurately. However, as I progress through my academic career, I plan to publish in open access journals, ensuring my research is freely accessible to the public, as well as reporting my results (including limitations) transparently and openly, opening the work up to scrutiny and potential collaborations.

TAYLOR MCCARTHY

She/They

PhD Student, University of Dundee

NFXL1 | ER-stress | Neuropathy | Mutations

By providing open information on methods and materials used in an easily accessible way. This, plus making personalised protocols to refer back to, allows clarity in producibility.

SIMONE MEDDLE

She/Her

Supervisor, University of Edinburgh

Behavioural neuroendocrinology | Animal welfare | Neuroscience

Publishing in open access journals and data sharing.

BRENDON MEDLEY

He/Him

PhD Student, University of St Andrews

Biofuel | Enzymology | Crystallography

I aim to report my data as clearly and concisely as possible when reporting my own work. Once I am ready to submit the data, I will read it over and see if I could carry out the same experiment if it was my first time reading my work.

CAMILO MUNOZ SCHULER

He/Him

PhD Student, University of Aberdeen

EvoDevo | scRNA-seq | Marine biology | Molecular biology

Specially for bioinformatics, it is really important to provide every resource that was used to get to the results. To secure reproducibility of our work, we will always provide our code explained, will submit our raw and processed data to the corresponding worldwide repositories and databases, as well as citations for every software used. In addition, we will always be open to provide online assistance, as needed.

EMILY ROBERTSHAW

PhD Student, University of Edinburgh

Evolution | Ecology | Chronobiology | Parasites

In our lab all protocols and data are shared between lab members and we regularly discuss updates via Slack channels and lab meetings. I keep both an electronic lab book (preference of the group) and a written lab book (my own preference, inserts signed and dated) as I find this the easiest way for me to report all findings and any edits to protocols as they happen.

THOMAS SMITH-ZAITLIK

He/Him

PhD Student, University of Edinburgh

Bacteriophage | Bioinformatics | Bovine mastitis

1. I keep a record of all bash scripts that I run with an explanation of each parameter listed at the bottom. 2. I think AI is likely to negatively impact science in general if it is not regulated (e.g. the retracted Frontiers in Cell & Developmental biology paper which used AI generated figures). 3. I often find published methods do not provide sufficient detail or explanation for their methods/reasoning behind their methods to allow sufficient reproduction. Although this may be a result of the limited word count allowed, I would nonetheless like to see supplementary documentation provided explaining how authors reached their methodology and explaining it further.

JOLANDA VAN MUNSTER

She/Her

Supervisor, University of Edinburgh/SRUC

Mycology | Lignocellulose degradation | Enzymology | Rumen microbiome

We publish our work as preprints so that it is freely accessible, and for peer-reviewed publications prefer community-led journals (e.g. journals from scientific societies). We make raw and annotated data available as supplementary data or via repositories, and we include detailed methods sections in publications.

KAIA WAXENBERG

She/Her

PhD Student, University of Edinburgh/SRUC

Food systems | Global health | Diet | Modelling

My work uses system modelling approaches to predict global food demand and dietary health outcomes. Transparency in model-based research is paramount, particularly around data sources, modelling approaches, assumptions, and uncertainty. Where possible, my work utilises established modelling methodologies and widely referenced global data sources to improve reproducibility of results and comparability across similar models. Reproducibility can be ensured by providing an open-source repository with all datasets and programming files. I believe this should be common practice for all modelling work across industry and academia, but competition and lack of collaboration in research has severely hindered progress.

SOPHIE WINTERBOURNE

She/Her

PhD Student, University of Edinburgh

Structural biology | Biochemistry | Bioinformatics

To enhance the reproducibility of my work, I create online repositories on GitHub/GitLab for all the projects I work on. I deposit the raw data and the code I write for the data analysis there and update the repositories when I make changes. In addition, I write a personal log file and document any issues I have and how these were overcome. For my small angle X-ray scattering (SAXS) experiments, the data is being deposited to the publicly available repository SASBDB.

QIFAN (LEO) YIN

PhD Student, University of Edinburgh

Hyperaccumulation | Phytomining | Phytoremediation | Heavy metal | Plant-bacteria Interaction

1. Publish research findings in open-access journals to provide free and unrestricted access to the scientific community and the public. Share raw data, processed datasets, and analysis scripts in public repositories. This allows others to validate and reproduce results independently. Thoroughly document experimental protocols and methodologies, including specific reagents, equipment, and procedures used during experiments. Clearly and transparently report research methods, statistical analyses, and results. Include all relevant details, such as sample sizes, statistical tests, and any unexpected findings. Encourage and conduct validation studies, either by the research team or independent groups, to confirm the reproducibility of key findings. Collaborate with other researchers and subject the research to rigorous peer review. Constructive feedback from peers can help improve the robustness of the study. 2. While AI holds the potential to positively impact the reproducibility of bioscience research through automation, predictive modelling, and data integration, addressing challenges related to interpretability, overfitting, data bias, and ethical considerations is crucial. Researchers need to adopt responsible AI practices, validate models rigorously, and ensure transparent reporting to harness the full benefits of AI while maintaining the reproducibility and reliability of scientific research. 3. Bioscience has faced specific challenges in replication and reproducibility. Issues like variability in biological systems, complex experimental procedures, and reliance on specialized reagents can contribute to difficulties in replicating experiments.

HOW DO YOU THINK ARTIFICIAL INTELLIGENCE WILL IMPACT THE REPRODUCIBILITY OF BIOSCIENCE RESEARCH IN THE NEAR FUTURE?

CHAK LAM CHAN

He/Him

PhD Student, University of Dundee

Plant immunity | Proteomics | Membrane protein

AI should make the reproducibility of the research even more important, as its data analysis depends on those from published data. Inconsistencies or inaccuracies of data could be exposed more easily if it includes methods of identifying and highlighting publications containing these, which would help to improve reproducibility. However, as bioscience research can be affected by higher number of variables unlike more maths-based physical sciences, it may also be more difficult to identify such inconsistencies and inaccuracies.

ROBYN GREENE

PhD Student, University of Edinburgh

Computational Neuroscience | Informatics | Machine Learning

Many are aware of the risks associated with using AI in science from high level discussion in mainstream news. However, mindful use of AI has potential to improve the state of reproducibility in bioscience. For example, provenance capture and modularisation of highly specialised software pipelines allow for more standardised data processing which is more easily checked by reviewers. Simultaneously, popular transformer-based tools such as chatGPT have lowered the threshold of specialist knowledge required to engage with current research, potentially opening the door to wider engagement and subsequently improved transparency in science. Overall, the impact of AI on bioscience in general will depend on the quality of communication from the machine learning community.

SAJAN MCCORKINDALE

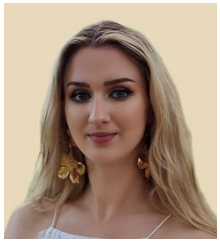
He/Him

PhD Student, University of Aberdeen

Sequencing | Environmental surveillance | Public health

I believe that AI could negative impact the reproducibility of bioscience research. Many machine learning models, by their nature, function as 'black boxes', the workings of which we cannot fully describe, and models trained on the same data are not guaranteed to produce the same output. These factors are hardly unique to AI, problems with randomness (or the lack thereof) permeates everything we do. However, as someone with a background in biosciences, I lack an awareness of the factors that can contribute to non-reproducibility when using artificial intelligence. This presents a problem, as I cannot effectively mitigate these issues, interpret results, or convey findings to others. Therefore, I think the issue is not the use of AI itself, but the lack of knowledge many of us may have about its function. Nonetheless AI is a powerful tool of considerable value, even with its drawbacks. I think for that reason it must be embraced, but in doing so we must ensure that we have a deep understanding of it. This can help us to ensure that we're using AI responsibly, and facilitate the implementation of additional considerations towards reproducibility.

EMILE MENSIKOVA



She/Her

PhD Student, University of Aberdeen

Epigenetics | Computational Biology | RNA modifications | Adaptation | Environmental Stress

I think that AI will have a strong impact on the reproducibility of bioscience research. AI tools can automate repetitive tasks, reducing the likelihood of human error and variability in experimental procedures. This would not only enhance the reliability of individual experiments but also contribute to the overall reproducibility of results across different projects. However, AI tools may lack flexibility needed to adapt to unexpected variations, which is especially important in biosciences, where experiments often involve intricate systems with multiple variables. It can be a great tool; however, reproducibility is tied with accessibility. The adoption of AI-driven automation systems in laboratories may involve substantial costs, which can create disparities in accessibility, limiting smaller research facilities to be able to reproduce these studies. It will be a balancing act to address these challenges, especially ensuring ethical and responsible AI use. It will definitely make a big impact in research!

AMY NEWELL

She/Her

PhD Student, University of Edinburgh

Plant photobiology | Translation | Shade

I think that AI will impact research reproducibility. However, I think that certainly in my area we will ultimately still need the data from wet lab experiments to feed into the AI. I can't see AI completely taking over in a wet lab environment in the near-future, therefore I think reproducibility will remain at a similar level to what it is today: reproducible if the experiment was well thought out and described well.

ANDREW NICOLL

He/Him

PhD Student, University of Edinburgh

Stochastic modelling | Statistical inference | Transcription

When applying AI in bioscience research, two key issues come to mind – the data used to train the AI model and its purpose, i.e. what question is it trying to answer? Defining precise questions and being judicious in selecting relevant, high-quality data for training models is crucial for maximizing their potential. Successful applications can involve tackling problems where human recognition of meaningful features and abstract relationships in data is challenging. But if the aim of one's research is to gain mechanistic insight on how a process/system/decision came to be, then posing the right questions is essential to prevent reliance on "black box" effects. Moreover, the standard of the training data is also incredibly important. If the data is not reproducible, if uncertainties and limitations aren't known and transparently acknowledged, and if the data is limited in scope, then the success of an AI model will be limited. Overall, I think AI has great potential to solve problems in areas like drug discovery, protein design (e.g. AlphaFold), precision medicine, and more, especially given the ever-increasing supply of biological data. However, I believe this future success could stall unless the underlying data is reproducible, openly reported, and accessible.

MARIA JULIANA RODRIGUEZ CUBILLOS

She/Her

PhD Student, University of Edinburgh

Metadata | FAIR | AI | Natural language processing

AI will affect reproducibility in bioscience in both ways. It could be favourable to create standard protocols that can be easily reproduced; AI-drive algorithms can manage large amounts of data and reapply methods the same way with minimal errors. However, not all scientists worldwide will be able to apply them as this would require, in some cases, sizeable computational capacity, manufacturing that is not accessible to everyone, or financial barriers. As scientists, we are responsible for reducing this gap as much as possible. Open-source initiatives and collaborative platforms can facilitate knowledge exchange. Also, we must create affordable technologies that make tools democratically available to everybody. It also requires the creation of ethical frameworks to ensure that AI applications are used responsibly and the benefits are equally distributed. Ultimately, this will be a brand-new way to produce knowledge, and we must build solid foundations to make it as fair as possible.

MARIA ROXANA

She/her

PhD Student, University of Aberdeen

Electrophysiology | Mitochondria | Skeletal muscles

AI is currently a valuable tool in bioscience research. It has a myriad of applications, ranging from detecting cancer in mammograms to drug screening. Major pharmaceutical companies, such as GSK, are already utilizing AI to assess the potential effects of drugs on specific tissues for predictive modelling and simulation. Furthermore, AI's ability to process and analyse large datasets with high consistency significantly reduces the likelihood of human error. This computational power facilitates more accurate and efficient hypothesis testing, data interpretation, and the discovery of novel biological insights. By enabling high-throughput data analysis and providing sophisticated pattern recognition, AI accelerates the pace of research, leading to faster development of new treatments and personalized medicine

approaches. AI's integration into bioscience research not only streamlines experimental workflows but also enhances the reproducibility of results, thereby addressing one of the current challenges in the scientific community.

ALASTAIR SOMERVILLE

He/Him

PhD Student, University of Edinburg

Survival | Infection | Host-virus interactions

AI could influence reproducibility both negatively and positively. We should view AI as a tool that can help us in science, but there should be clear guidance on its use and application, and when it is appropriate. Until this is achieved, researchers should expect tougher scrutiny of their work if it uses AI.

LUCY TURNBULL

She/They

PhD Student, University of Edinburgh

Plant development | Evolution | Biotechnology

I am sceptical that AI will be able to replace practical experiments. AI works on pre-formed conclusions, and thus it is not a sufficient tool to account for reproducibility. In practical bioscience experiments, replication and reproducibility is essential; even in a repeated experiment, vastly different outcomes can arise, leading us to a more accurate experimental conclusion. Practical experimentation is not replaceable with AI.

RAFFEE WRIGHT

PhD Student, University of Edinburgh

Embryogensis | In vitro modelling | Genetics

Depending on the context, I think AI would be able to aid in reproducibility by having automated low-bias technology able to carry out certain analysis. One hurdle to this could be that some AI platforms (such as chatGPT) can sometimes run different algorithms and produce different answers to the same question/query.

DO YOU THINK THERE IS A REPLICATION/REPRODUCIBILITY CRISIS IN SCIENCE (IN GENERAL) AND IN BIOSCIENCE (IN PARTICULAR)?

THOMAS BALLINGER

He/Him

PhD Student, University of Edinburgh

Assembly dynamics of protein nanocompartments

I do believe there is a reproducibility problem in biosciences at the moment. The entire field of biosciences and molecular biology is a relatively new area of science that has progressed dramatically over a short period of time, and I think it's simply a matter that proper and rigorously tested standards and protocols have simply not have had enough time to come about. Thinking critically about how to make measurements reproducible while using new technology both within and across labs is a good first step.

BETHANY BRIDGE

She/Her

PhD Student, University of Edinburgh/SRUC

Ecology | Agroforestry | Bioacoustics | Landscapes | Agriculture

Yes I do, I think we are too quick to publish work without proper vetting, and reproducing work that can often be seen as a waste of time/resources.

ALICE BUCKNER

They/Them

PhD Student, University of Edinburgh/SRUC

Rumen | Microbiology | Bioinformatics | 16S | Sustainability

Yes I do think there is a replication/reproducibility crisis. This can be more easily tackled in bioinformatics with the publication of raw data and code, however with lab-based work it can be more complex. I have found the methods sections of many publications often inadequate in explaining exactly how an experiment could be reproduced, often missing out

key details, and although replicates of an experiment within a lab may be consistent, this doesn't mean they will be consistent between labs. In an ideal world, I think results generated in the wet lab should be verified by an external lab to ensure their methods and results are reproducible. However, this would be time-consuming, expensive, and logistically unsustainable.

BROC DRURY

He/Him

PhD Student, University of Edinburgh

Immunology | Gut | IBD | Human | Mouse

Yes, I do think there is a reproducibility crisis in science. The 'Reproducibility Project: Cancer Biology' was a rigorous example of this, where only 5 of 50 experiments from highly influential preclinical cancer studies (from 2010-2012) could be replicated. However, I think that because of the highly variable nature of bioscience, more leniency needs to be applied. I think that biologists have a general understanding that results can never be truly replicated in biology and that trends are far more important than comparing the like-for-like scale/numbers between studies. That being said, there are several factors that influence the reproducibility crisis which are within our control. The most important, in my opinion, hinges around the research culture of science whereby high pressure and an unhealthy obsession with 'positive' and 'novel' discoveries as appose to 'negative' and 'rigorous' findings pushes science to go too fast and strongly tempts scientists to cheat. Some studies have suggested that up to 90% of research funding has been wasted due to lack of reproducibility. I would argue that improving a poor research culture is the most controllable way to limit reproducibility failure in science.

ABDELAZEEM ELHABYAN

He/Him

PhD Student, University of Edinburgh

Virology | Tissue Culture | Cloning

Several high-profile studies in various fields, including psychology and cancer biology, have failed to replicate their initial findings. This casts doubt on the generalizability and reliability of the research. Factors like pressure to publish novel and exciting results, inadequate funding, and lack of methodological rigor have been identified as contributing to irreproducible research.

EMILY FIELDS

They/Them

PhD Student, University of Dundee/JHI

Climate resilient potatoes | Genetic engineering

I do think there is a reproducibility crisis in bioscience, in large part due to the pressures to publish novel data. While holding breakthroughs in high regard via grants and papers pushes our fields of research forward, repeating experiments is often considered unnoteworthy and very low priority. Due to limited budgets and time, this crucial base of research is deemphasized unless there is a way to build novelty onto the existing technique/approach. When trying to repeat and then build on experiments, and results are unable to be reproduced, the result is even more money and time being spent trying to replicate previous results. Often these efforts go unreported and unpublished, especially if the results are negative due to our current values in publishing. Additionally, using only the published methods to replicate experiments often requires further information to be filled in via the actual lab protocols. This is why complete and open publishing and data sharing is essential to moving out of the reproducibility crisis.

EMMA GANLEY

She/Her

Guest Speaker, protocols.io

FAIR reproducible methods sharing

Not a reproducibility "crisis", but a big challenge. But, fortunately, one that we do have is tools to help tackle. Facilitating better research practice in researchers can ensure

comprehensive records of how research is performed, which would go a long way to addressing this issue.

INKE NÄTHKE

She/Her

Guest Speaker, University of Dundee

Research culture | Cancer Cell Biology | Epithelial tissues

Good record keeping, publishing in open access journals and preprint servers. Looking at all primary data regularly. AI can help and hinder. We need to learn how to use it properly and understand its potential and limitations. I do not think there is a reproducibility crisis. Usually (not always) reproducibility is hindered by lack of precise descriptions of methods and reagent (poor documentation). There are cases of misconduct, i.e. deliberate manipulation of data, which lead to lack of reproducibility. These are immensely damaging to everyone in our communities, even if they are not common, when considering the enormous volume of research. Genuine mistakes and poor research practice in published work is much more common and can also lead to reproducibility issues.

CARYS REDMAN-WHITE

She/Her

PhD Student, University of Edinburgh

AMR | Epidemiology | Modelling | One Health | Antimicrobials

I do think there is a reproducibility crisis in science in general, and in bioscience in particular. In my field, epidemiological modelling, papers frequently fail to include the full methods - especially code, submodel results, and datasets - or made available, even in the highest impact journals. I have had to contact authors to trace widely-cited figures in order to find out where the figures actually came from, which should not be necessary.

JAVIER SÁNCHEZ UTGÉS

He/Him

PhD Student, University of Dundee

Protein structure | Genetic variation | Function prediction | Drug discovery

All the code and results resulting from my research are made public on GitHub repositories and Zenodo and findable using their DOIs, and the journals the research is published on are open access. I think if one wants to make their research reproducible, it is possible. There are many tools available to do so, despite all version changes, and other struggles. I do think there is a reproducibility crisis. It is unbelievable there are still authors who don't make their code public, and don't provide the data when asked.

CRISTOPH WAGNER

He/Him

PhD Student, University of Edinburgh

Self-regeneration | Synthetic cells | Microfluidics | Cell-free | ODEs

I do think that there are issues with reproducibility, for a variety of reasons like insufficiently described methodology and lack of standards in biology. Solutions to the former can be higher expectations by institutions and publishers, while the latter can be tackled through, for example, standardisation of biological parts in Synthetic biology.

EMMA WILSON

She/Her

Guest Speaker, University of Edinburgh

Evidence synthesis | Open research | Reproducibility | Neuroscience

The methods we used to conduct research, and the ways in which we share research evolve over time. I think we should be optimistic and look at reproducibility and open science as approaches to improve the quality and robustness of our work.

CHUMENG ZHU

She/Her

PhD Student, University of Edinburgh

Bioinformatics | Evolution | Variants | Livestocks | Biodiversity

Yes, I think the replication/reproducibility crisis does exist in academic research. I have experienced such

situations: the raw datasets are not available in published articles; codes or commands to generate the core results are not provided or partly provided; the reproduced results are slightly different from the results in the paper.

OTHER PROFILES

TEMITAYO ADEMOLUE

He/Him

PhD Student, University of Edinburgh

Immunoparasitology | Host-Pathogen Interaction | African Trypanosomes

JAMES AINGE

Supervisor, University of St Andrews

Memory | Hippocampus | Entorhinal cortex | Place cells | Grid cells

MUHAMMAD ZAMAN KHAN ASSIR

PhD Student, University of Aberdeen

Neuroscience | Development | 3D human models | Organoid | Autism

PHOEBE BEAL

She/Her

PhD Student, Moredun Research Institute

Tolerance to nematode infections

ANNETTE BOERLAGE

Supervisor, Scotland's Research Institute

Aquatic epidemiology | Gill health | Statistics

MAX CHARLES VALLARINO

He/Him

PhD Student, University of Aberdeen

Genomics | Immunology | Aquaculture | Cell Culture

NIK COPELAND

He/Him

Advisory Board, Lancaster University

DNA replication | DNA replication stress | Cell cycle | Cancer

BARBARA DE QUEIROZ MONTEIRO BLACK

She/Her

PhD Student, University of Edinburgh

Variation | Ageing | Innate Immunity | Infection Outcome | Drug Response

RICK D'EATH

He/Him

Supervisor, Scotland's Rural College

Animal Behaviour | Animal Welfare | Agriculture | Precision Livestock Farming

KATE DUBARRY

She/Her

PhD Student, University of Edinburgh

Single cell | Transcriptomics | Bioinformatics | Livestock | Sheep.

RICHARD EDEL

PhD Student, University of St Andrews

Molecular biology | Oligomerization | Imaging | Fluorescence microscopy | Cloning

VERA EORY

She/Her

Supervisor, Scotland's Rural College

Greenhouse gas emissions | Farmers' behaviour | Policy

ROSIE GALLAGHER

She/Her

PhD Student, University of Dundee

Computational Biology | Data analysis | Notch Signalling pathway

VALENTINA GIAI

PhD Student, University of Edinburgh

Islet transplantation | Graft rejection | Inflammation | Engraftment

SAMUEL GIBBON

PhD Student, University of Edinburgh

Retinal image analysis with AI

JED HAWES

PhD Student, University of Dundee

Epigenetics in Malaria

MAX HAYHURST

PhD Student, University of Dundee/JHI

Microbiology | Biochemistry | Biotechnology | Plant-microbe interactions

JACK HENDERSON

He/Him

PhD Student, University of Aberdeen

Microbiology | Chemistry | Sustainability

EMILIE HOLLVILLE

She/Her

Supervisor, University of Aberdeen

TALAL HOSSAIN

He/Him

PhD Student, University of Edinburgh

Phage | Machine learning | Genomics

DAVID HUGHES

Supervisor, University of St Andrews

Virology | Innate immunity | One Health

AMANDA JARVIS

Supervisor, University of Edinburgh

Sustainable chemistry | Artificial enzymes | Unnatural amino acids

ANETT LADANYI

She/Her

PhD Student, University of Edinburgh

lncRNA | RNA-protein binding | Conserved RNA motifs | Cellular stress response

MARCUS LEE

Supervisor, University of Dundee

Malaria | Drug Resistance | Genome Engineering

JESSICA MATTHEWS

She/Her

PhD Student, University of Edinburgh/SRUC

Anaerobic fungi | Enzyme expression | Lignocellulose degradation

AMELIA NEWTON

She/Her

PhD Student, University of St Andrews

Performance anxiety | Performance psychology | Performing arts

ROSE PARSA

She/Her

PhD Student, University of Edinburgh

Streptococcus | Bovine mastitis | Surface proteins

MELANIE PODBIELSKI

She/Her

PhD Student, University of Edinburgh

Metal nanoparticles | Biosynthesis | Battery recycling

CRISTINA PONCE LILLY

PhD Student, University of Edinburgh

Microbiology | Chemistry | Sustainability

ARIANNA SCHNEIER

She/Her

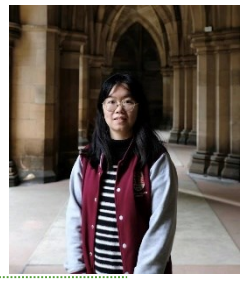
PhD Student, University of Edinburgh

Biofilms | Waste valorisation | Microbial biotechnology

YUXIN SHEN

PhD Student, University of Edinburgh

Machine learning | Synthetic biology | Gene expression



MARIUS WENZEL

Supervisor, University of Aberdeen

Bioinformatics | Genomics | Epigenetics | Evolution | Molecules

BIBIANNA ZIRRA-SHALLANGWA

PhD Student, University of Edinburgh

Epidemiology | Viruses | Tanzania


1495
UNIVERSITY OF
ABERDEEN


University
of Dundee


THE UNIVERSITY
of EDINBURGH


University of
St Andrews


UNIVERSITY of
STIRLING


CFA
COOL FARM ALLIANCE


IBioIC


Moredun


The James
Hutton
Institute


SRUC


eastBIO
East of Scotland Bioscience
Doctoral Training Partnership


UKRI
Biotechnology and
Biological Sciences
Research Council