SDM PROGRAM

10 Feb 2023

1030: **Welcome and Overview of RAS E&O strategy**

Professor Belinda Wilkes, University of Bristol

1050: **Tricking social media recommendation algorithms to engage the “unreachable”**

Dr. Rebecca Smethurst, University of Oxford

1115: **“I learned to look up” (carer on a respite break to the Isle of Coll)**

 Dipa Ward, Care for Carers

 Steven Gray, Cosmos Planetarium

1135: **Astrojots: In Space, No-One Can Hear you Scribble**

Professor Geraint Jones, University College London

1150: **Simulating Space Missions as a method of engagement**

 Stuart Rogers, Cerebral Ape Ltd

1205: **RAS Education and Outreach since 2014**

 Lucinda Offer, RAS

Sheila Kanani, RAS

1235: Lunch Break (45 mins)

1320: **Practical and meaningful evaluation of engagement**

Sarah Jenkins, Director, Jenesys Associates

1345: **Orbyts: Research-with-Schools Projects that Transform Inclusivity in Science**

Dr. William Dunn, University College London

1410: **Aspects of Public Outreach in "The Deep" North East**

 Professor Martin Ward, Durham University

1425: **ESERO-UK – Space Inspirations**

Tom Lyons, STEM Learning, online

1440: **New audiences for old books?**

Sian Prosser, RAS Librarian

1455: **Poster `Haiku’ Session** (3\*1 min 1 slide poster summary)

* Improving the Key Stage system for schools – Dr. Brian Sheen, Cornwall Sea to Stars
* Conducting Successful Public Stargazing Events – Steve Tonkin, FAS Cranborne Chase – ST online

1500: **General RAS E&O Discussion**

 Led by members of RAS E&O Strategy Group

**Ordinary Meeting (SDM sessions continued): 1600 (after tea)**

 **Extending Astronomy Outreach through Eisteddfodau in Wales**

Professor Eleri Pryse, Aberystwyth University

**Access to the Universe for all**

 Professor Andrew Newsam, Liverpool John Moores University

Ordinary Meeting Details:

<https://ras.ac.uk/events-and-meetings/ras-meetings/ras-ordinary-meeting-february-2023>

**Invited Talks**

**Abstracts and Bios**

**Overview of RAS Education and Outreach Strategy 2023**

Professor Belinda Wilkes, University of Bristol

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Strategy Overarching Vision: Deliver quality E&O programs in both Astronomy and Geophysics, taking full advantage of the ability of our science to inspire, and to promote an interest in, and understanding of, STEM as a whole. Make the most of our subjects’ potential for enhancing well-being and quality of life, and for providing reflection on our place in the Universe.

I will summarise the four major aims of the E&O Strategy being developed by the RAS and discuss some of the specific objectives and actions to which they lead.

**Dr. Belinda Wilkes** is a Royal Society Wolfson Visiting Fellow at the University of Bristol UK, and an Honorary Fellow of Jesus College, Cambridge, UK. She recently retired as a Senior Astrophysicist at the Center for Astrophysics | Harvard & Smithsonian (CfA), USA. She was born in England, obtained a BSc in Astronomy and Physics from the University of St. Andrews in Scotland, and a PhD in Astrophysics from the University of Cambridge, England (Jesus College). She then moved to the USA, spent 2 years as a NATO postdoctoral fellow at the Steward Observatory, University of Arizona, and moved to the High Energy Astrophysics Division at the CfA in 1984. She served as Director of NASA’s Chandra X-ray Center from 2014-2020. Dr. Wilkes’ research involves X-ray and multi-wavelength studies of active galaxies: super-massive black holes in galaxy nuclei.

**Tricking social media recommendation algorithms to engage the**

**“unreachable”**

Dr Rebecca Smethurst, University of Oxford

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Producing content for an online audience on social media is an excellent way of reaching people worldwide with scientific topics. However, the majority of social media platforms, including YouTube, TikTok, Instagram and Twitter, all employ neural networks in order to make content recommendations to their users. These machine learning algorithms use inputs such as age, gender and location in order to make recommendations based on other user’s activity. This results in an insular network of users who engage with science content online. For example, YouTube channels with male presenters are more likely to be watched by other men, and therefore recommended to more men. However, of the top 25 science & technology channels by subscribers on YouTube in 2021, 23 are run by men. This leads to a situation where subsets of the public are being excluded from the scientific conversation online unless they specifically search for that content, e.g. young girls or countries without government space agencies where engagement in traditional media with astronomy content is low. I shall share my experiences producing content for social media, in particular for the astronomy YouTube channel “Dr Becky” with over 500,000 subscribers and 44 million total views, that specifically aims to overcome the constraints set by recommendation algorithms in order to engage the “unreachable” online.

**Dr Becky Smethurst** is a Royal Astronomical Society research fellow at the University of Oxford. Her research is focussed on low-redshift galaxy evolution studies; particularly the processes responsible for the non-merger driven growth of supermassive black holes and their subsequent AGN feedback effects. In addition she is an enthusiastic science communicator, producing weekly content for her award winning YouTube channel ‘Dr Becky’ with over 500,000 subscribers. She is also an author of public science books, with “A Brief History of Black Holes” released in September 2022.

**“I learned to look up”** (carer on a respite break to the Isle of Coll)

Steven Gray (RAS 200 Care for Carers Astronomy link, advisor and educator)

Dipa Ward (Care for Carers – RAS Astronomy Project Lead)

Care for Carers and Cosmos Planetarium

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We are an Edinburgh based charity and have been working with unpaid carers for over 25 years providing support, respite opportunities, training and learning programmes. As part of this work, we have been fortunate to have formed a very close working partnership with Our Dynamic Earth thus providing a unique opportunity to offer Science based activities within our remit. Our bid for RAS 200 was very much inspired by and informed by this work with the result that Astronomy and Geophysics has become an integral part of all the work that we do.

Our session will explore the methods that we have used to bring the subject to unpaid carers of all backgrounds, our partnership with Our Dynamic Earth and Cosmos Planetarium and how this has evolved to meet the needs and expectations of the people that we support as well as the requirements of our funders. We are passionate about keeping the work alive and to see it evolve meaningfully and are delighted to be asked to contribute “ towards a consistent and coherent strategy for RAS Outreach, Engagement and Education activities”.

**Dipa Ward**: BA (Hons) Humanities, PGCE Community Education

28 years working within the Voluntary Sector in Edinburgh with last 11 years as Carer Short Breaks worker and RAS Astronomy Project lead.

**Steven Gray:** FRAS, Planetarium Director, President of the British Association of Planetaria, Churchill Fellow. Considerable experience engaging with the public, developing bespoke shows, content and running presenter led sessions and pivotal to the success of the Care for Carers RAS 200 project both as advisor and educator since its inception.

**RAS Education and Outreach since 2014**

Lucinda Offer, Royal Astronomical Society

Sheila Kanani, Royal Astronomical Society

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The Royal Astronomical Society’s Education and Outreach team have been working to connect with as much of the UK public and students as possible, since 2014. Our initial approach was to establish the RAS as a source of independent expertise and as a delivery partner for events encompassing different communities. The Society is now refreshing its strategy, and our approach to public engagement is a central priority for our staff and trustees alike. After nearly a decade of success, with our work recognised by awards and honours, we are well-placed to align our activity to the strategic aims of the RAS.

In addition to events and workshops organised at Burlington House for a diverse public of all ages and Fellows, we’ve also organised national events, given school talks, taught GCSE Astronomy in two UK locations and online, conducted outreach at community events such as summer festivals and in libraries, and presented at UK and international conferences. We would like to share the E&O work we do for the RAS, show how the work has evolved from pre- to post-strategy times, as well as outline our focus for the year ahead.

**Dr Sheila Kanani** is a British planetary scientist, teacher, science communicator, author and self-alleged space comedian with a background in research from UK universities. Sheila has been one of the Education and Outreach officers and the Diversity Officer at the Royal Astronomical Society since 2014, is a primary school parent governor, STEM ambassador and was awarded an MBE in the New Year Honours List 2022 for services to astronomy and diversity in physics

**Lucinda Offer** is the Education, Outreach and Events Officer for the RAS. She was the Executive Director of the Mars Society USA from 2009-2021 which worked to prepare humans for living and working on Mars via two-week simulations at their habitats in Utah and the Arctic. She is the Chair of National Astronomy Week in the UK and an Honorary Visiting Fellow for Bayes School of Business at City, University of London.

As a former NASA Associate, she participated in four NASA Spaceward Bound expeditions to the Mojave, Australia, Abu Dhabi and New Zealand. She was also a NASA analogue mission tele-roboticist for Crew 97 at the Mars Desert Research Station testing and deploying a rover to work along future crews.

She studied Geology and Art and Design as an undergraduate, Science Education and Communication at graduate level and earned a distinction in Astronomy as a post-graduate while at universities in California, Scotland, and England. She is also a credentialed science teacher in both the US and UK and has taught Earth and Space Science, Physics and Astronomy since 2004. She currently teaches GCSE Astronomy at the Royal Astronomical Society’s headquarters in Burlington House, Piccadilly, London.

**Practical and meaningful evaluation of engagement**

Sarah Jenkins, Director, Jenesys Associates Ltd

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Using practical examples, this presentation will help to answer the question: ‘how will I know if my engagement achieved what I set out to do?’ It will cover: differences between monitoring and evaluation; what to evaluate and how; data collection; and making evaluation accessible and engaging

**Sarah Jenkins** is founder and principal consultant of Jenesys Associates - a professional, independent consultancy specialising in evaluation of all forms of public and community engagement. Since 2006, working alone or with carefully selected associates, she has successfully completed c.150 evaluations for initiatives ranging from single projects or one-off events, to international multi-partner programmes worth £10s of millions, including the RAS200 engagement programme.

Jenesys Associates’ client base comprises leading universities, professional bodies, learned societies, research funders, museums, science centres and charities. Her expertise covers the entire spectrum of formative, summative and process evaluation, with particular skill in evaluating programmes that have equality of opportunity and diversity at their core. She is dedicated to making evaluation appropriate and accessible for all audiences and has worked with every imaginable group, covering diverse communities and cohorts from all demographic backgrounds.

**Orbyts: Research-with-Schools Projects that Transform Inclusivity in Science**

Dr William Dunn, University College London

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Teachers D. Fleming & W. Whyatt say:

*“Orbyts has surpassed anything I could have imagined - not only have our students been consistently blown away by the science of other planets, it has helped them better understand the value of their own one. Orbyts is definitely one of the coolest things I've been exposed to in my 15 year career.”*

*“It’s clear to me that the Orbyts project has been the most successful project we have been fortunate to work with and its importance cannot be overstated.”*

So what is Orbyts, how is it having such a profound impact and what makes teachers think it’s so cool?

UK science has chronic diversity issues and shortages of specialist teachers in schools. Orbyts is a multi-award-winning movement, now running across the UK, that creates partnerships between scientists and schools that are proven to address these issues. The programme provides school students with relatable science role models while empowering them to conduct original research projects. This structure of regular interventions, inspirational role models and active ownership of research is proving to be transformative; dispelling harmful stereotypes and profoundly shifting perceptions of science and scientists. It is particularly impactful for groups historically excluded from science. For example, our partner schools report 100% increases in girls uptake of A-level physics, following participation in an Orbyts project at GCSE. The programme has enabled more than 220 school students to become authors of scientific papers in the last 5 years.

This year, Orbyts researchers will partner with schools to support research projects on: medical physics, exoplanets, aurorae, AI and machine learning, plasma, space weather and quantum physics.  I’ll showcase a whistle-stop tour through some of last years projects, where possible letting recorded presentations by the schools do the talking.

**Dr. William Dunn** has run Orbyts since 2017. He currently holds an Ernest Rutherford Fellowship in the UCL Astrophysics group, through which he studies the X-ray emissions from planets using NASA and ESA spacecraft. Before his ERF, he held fellowships at the Harvard-Smithsonian Center for Astrophysics in the US, a European Space Agency NPI fellowship at ESAC (Spain) and at UCL's Mullard Space Science Laboratory (UK), where he undertook his PhD and held a PDRA role. Prior to his PhD, he launched programmes for Amazon and spent 6 years working on shop floors for Arcadia Group, All Saints and Megacity, while doing his MSci at UCL.  At various points in life, he's been a semi-professional dancer, a semi-professional MtG player, a school governor and has tried to see as much of the world as life would let him.

**Contributed Talks**

**Abstracts**

**Astrojots: In Space, No-One Can Hear you Scribble**

Professor Geraint Jones, University College London

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Astrojots is primarily a web-based project for which the author - a planetary scientist - creates cartoon strips to explain various aspects of planetary science and exploration, space science, and astronomy. The overall aim of the strips is to be informative, educational, and engaging, with a good sprinkling of humour! The cartoon strips are created under a Creative Commons licence, allowing them to be freely printed and distributed, as long as they are not amended and that their source is identified. The intended audience for Astrojots cartoons is as demographically wide as possible. However, the correspondence of the strips’ topics with areas of the UK schools' national curricula are highlighted on the project website to aid teachers’ use of the resource. The usual format is suitable for printing on A4 paper for further free distribution by educators. The influences, successes, challenges of the project are described. Lessons learnt since the beginnings of the project are outlined, as well as the strategies employed to balance the cartooning against research tasks and other commitments. The project website is www.astrojots.com , @astrojots on Twitter. This work was kindly funded by UKRI-STFC under their Public Engagement Fellowship scheme.

**Simulating Space Missions as a method of engagement**

Stuart Rogers, Cerebral Ape LTD

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Whether it is the James Webb Space Telescope or the Perseverance Rover any space mission has two main compelling elements to it, furthering our knowledge of the universe and the innovative technology that allows us to achieve this. Under my science communication company, I run an online educational experience that mimics a real Mars rover mission and I believe that this immersive approach to learning can really inspire the next generation into the STEM roles that the space and astronomical sector requires for the future. In my talk I will detail how I simplify the real-world science and procedural technicality of rover operation while also keeping the overall concepts as close as possible to real life. I will also detail how the session encourages the participants to make mistakes to deepen knowledge retention and relate the experience to STEM careers. Finally, I will emphasise the importance of any outreach project being metric lead along with having a consistent approach and format.

**Aspects of Public Outreach in "The Deep" North East**

Professor Martin Ward, Durham University

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Geographically the Northeast is far from the RAS centre of gravity. Despite having several World Class universities, it is unfortunately also a region of relative poverty and social deprivation. We are building on local astronomical links e.g. the Grubb Parson's legacy, the third oldest University Observatory, Thomas Wright's cosmology and links with Kielder Observatory, to engage these communities in topics such as citizen science. RAS support could add value and enhance the reach and scope of our efforts.

**ESERO-UK – Space Inspirations**

Tom Lyons, STEM Learning, Yorkshire

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ESERO-UK has been established at the National STEM Learning Centre through funding from ESA and the Department for Education. ESERO-UK promotes space in the UK and the use of space to enhance and support STEM teaching and learning in the UK. The resources bring together materials from ESA and other providers to both promote space exploration, and also help teachers and lecturers to use space as an engaging context for teaching and learning in STEM subjects. In addition to its resource collections, ESERO-UK has established a network of space ambassadors across the UK to actively support partners from the space education sector in their work with schools and colleges.

**New audiences for old books?**

Sian Prosser, Librarian, Royal Astronomical Society

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The library and archives of the RAS have been at the heart of a variety of outreach and education activities in recent years. These activities have taken place in person and online. As we consider a coherent strategy for RAS outreach, engagement and education activities, how can our collections continue to play a part? The strategic future development of the library and archives is consistent with our aim to increase our impact and reach underrepresented and underserved communities. Our in-person activities range from high impact, high footfall participation in Open House London, to bespoke library tours for groups like Open Age. The library and E&O teams designed a workshop on Caroline Herschel, featuring science demonstrations, drama, art and a chance to read the astronomer’s handwritten observations in the RAS archives. We have also been enhancing the online presence of our collections, for example in 2019 our collaboration with the British Film Institute led to a third of a million views of newly rediscovered eclipse film footage from 1900. The pandemic closed the physical library to visitors but opened up the possibility of virtual tours for groups like Care for Carers. We have had positive feedback on these activities, but more needs to be done. The strategic objectives that we are developing for the library and heritage collections are necessary to their continued use in outreach and engagement. Focus 1 is collections development and management. This includes identifying gaps in our collection, especially work by underrepresented groups. Focus 2 involves making the collections more discoverable. For example, digitising the observation notebooks of Caroline Herschel, making them accessible to a wider audience. Focus 3 is about community engagement, such as working with the E&O team to build on the Caroline Herschel and comet workshops by designing more interactive educational events. Investing in managing, describing and digitising the collections is fundamental to being able to involve our fellows in using them to tell stories about the development of astronomy and geophysics in an accessible way.

**Short Talks/Posters (2:55pm)**

**Abstracts**

**Improving the Key Stage system for schools**

Dr, Brian Sheen, Director Roseland Observatory, Cornwall Sea to Stars

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The Key Stages are at a lower level than most astronomers like to work at. Hence, they could do with some improvement. The presentation seeks to at least make a start in that direction.

**Conducting Successful Public Stargazing Events**

Steve Tonkin, FAS, Cranborne Chase International Dark Sky Reserve, Fordingbridge Astronomers

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There is more to organisation than just getting a few folk with telescopes into a field!

\* Clear purpose

\* What makes a good location

\* Choosing a date

\* Advertising and publicity

\* Booking?

\* Safety and Risk Assessments

\* Format of the session

\* Practical considerations including toilet facilities, catering for children and people with special needs

\* Co-ordinating the Stargazing leaders

\* Making stargazing accessible for those who wish to take it up

\* Feedback and Review