



The Pioneering Outreach and Public Engagement in STEAM Conference

Abstract Booklet

#POPSConf24

Activity	Time	Rooms/Session Information		
Arrival, Registration and Refreshments	09:30-10:00	2.07 (Luggage/Coats etc. can be safely stored in room 2.03; Quiet Room is 2.04)		
Opening Address	10:00-10:10	2.06 Zoe Knowles, Professor of Engagement and Learning, Liverpool John Moores University <i>Welcome to LJMU and the 'Pioneering Outreach and Public Engagement in STEAM' Conference, 2024</i>		
Keynote Address	10:10-10:50	2.06 Laura Colucci-Gray, Professor of Science and Sustainability Education, University of Edinburgh <i>Beyond the veil: Reconfiguring STEAM for a Sustainable and Equitable Science Education</i>		
Parallel Session One (3 x 15min Contributed Talks and 5min Q&A)	11:00-12:00	2.05	2.06	2.09
		<i>Connecting to Underserved Families: How UK Unplugged made Engagement Work through our Environmental Chemistry Box and Event</i> Diana Powell	<i>Art-making and Developing 'Possible Selves' – a STEAM Model for HEIs?</i> Jo Trowsdale	<i>Authentic Outreach and Public Engagement – Your Personal Journey</i> Tim Gabriel
		<i>Back to School (Finally!) – University STEM Outreach in the New Normal</i> Emma Nichols	<i>City Sparks: Co-producing STEM Learning Experiences at the Science and Industry Museum</i> Ruth Murray	<i>Demonstrating Complex Chemical Concepts to a Young Audience</i> Lorelly Wilson
		<i>Creating a STEM Outreach Programme that Benefits both its Young Attendees and Student Facilitators</i> Erin Brady	<i>Independent Research Projects: Supporting Young People's Identity and Aspirations</i> Ali Rouncefield-Swales	<i>What do we mean by STEAM? The importance of balance</i> Carol Davenport



Parallel Session Two: 5min Lightning Talks	12:00-12:45	2.05	2.06	2.09
		Gina Washbourn	Megan D'Alton	Melissa Whitehouse
		Mark Roughley	Aaisha Patel	Vicky Ellingham
		Steph Bevan	Adrian Garcia Burgos	Anna Kirkham
		Cate Cropper	Rachel Schwartz-Narbonne	Kat Presland
		Helen Beckett Wilson & Lindsey Metcalf McGrath	Gemma Reed Avril Rowley	Sarah Myers Victoria Brennan
Lunch and Networking	12:45-13:30	2.07		
Second Keynote	13:30-14:15	2.06 Andy Newsam, Professor of Astronomy Education, Liverpool John Moores University <i>A Universe for All: Public Engagement, Impact and the REF</i>		
Parallel Session Three (2 x 15min Contributed Talks and 5min Q&A)	14:30-15:15	2.05	2.06	2.09
		<i>Designing Learning in Partnership with Teachers</i>	<i>More than Words - The story of a non-verbal experiment</i>	<i>ChemBoost, Establishing and Evaluating an Online Chemistry Tutoring Programme</i>
		Richard Davies & Jo Trowsdale	Wendy Sadler	Mel Lacey & Alexandra Males
		<i>A Lifetime of Chemistry Outreach</i>	<i>Evaluation as an Opportunity, Not a Chore</i>	<i>Reaching New Audiences through Innovative Public Engagement</i>
		Debbie Willison	Rory McDonald	Carsten Welsch
Break and Refreshments	15:15-15:30	2.07		
Roundtable Discussion	15:30-16:30	2.08		
Call to Action and Closing Remarks	16:30-16:45	2.06 Keith George, Pro-Vice Chancellor of Research and Knowledge Exchange, Liverpool John Moores University <i>Closing Address</i>		
Drinks Reception	17:00-18:00	2.07 <i>Informal Networking Opportunity</i>		

Keynote Presenters

Morning: Professor Laura Colucci-Gray, University of Edinburgh (laura.colucci-gray@ed.ac.uk)

‘Beyond the veil: Reconfiguring STEAM for a Sustainable and Equitable Science Education’

Abstract:

As an acronym, STEAM (Science, Technology, Engineering, Art and Mathematics) stands alone, with no past and no future, it has become a passe-partout for gaining access to funding for scientific research and to support public engagement and outreach, with a view to engage wider communities of citizens and students in schools. Yet, STEAM as an assemblage of very distinct bodies of disciplinary knowledge, each one with their own histories, methods and particular ways to relate with the world, is not a neutral term. It encompasses contrasting and conflicting agendas which have been longstanding features in the history of science and its relationship with the environment and with society. In this talk, I will offer a series of case-study examples of STEAM education to argue for a radical shift in the ways in which we approach the potential of reconfiguring STEAM drawing upon its own potential for reconfiguration. Challenging disembodied and instrumental narratives of knowledge, I will put forward the enactment of transdisciplinary, socio-material practices, that are situated, participatory, diverse and constantly in-the-making.

Biography:

Dr Laura Colucci-Gray is Professor of Science and Sustainability Education at Moray House School of Education and Sport, University of Edinburgh (UK). Laura has a long-standing career of teaching and research in science education with a particular focus on the theorisation and design of transdisciplinary and participatory approaches to address sustainability issues. She has led and has been co-investigator on several interdisciplinary research projects and she has published extensively with a research portfolio spanning contributions across teacher education, ethnographic research in school gardens and interdisciplinary collaborations in citizen science. In 2018, Laura led the first International Research Commission on STEAM education, funded by the British Educational Research Association and she is currently involved in SENSE.STEAM, one of three 1 million Euro projects funded by the Horizon Europe Programme Roadmap to STEAM.

Afternoon: Professor Andy Newsam, Liverpool John Moores University (a.newsam@ljamu.ac.uk)

‘A Universe for All: Public Engagement, Impact and the REF’

Abstract:

The status of outreach and public engagement with research has undergone a sea change in recent years, with the concept of impact, and its significance in the REF, leading to many universities investing in and supporting engagement as a core activity. However, that increased visibility and consequence has led to some challenges. In particular, the very specific definition of Impact within the REF creates complications when designing, developing, delivering, and evaluating engagement activities. Here I discuss some of these issues and use the specific example of the Schools' Observatory project to show how successful engagement and REF Impact Case Studies can co-exist.

Biography:

Andy is Professor of Astronomy Education and Engagement and Director of the Schools' Observatory at the Astrophysics Research Institute of Liverpool John Moores University, roles which combine 'normal' academic activities for research and lecturing with responsibilities for public engagement and school education. The Schools' Observatory is an online resource for school students of all ages and their teachers which gives access to observations from the world's largest robotic telescope - the Liverpool Telescope on La Palma in the Canary Islands. The website uses the appeal of astronomy and space to engage pupils with wider STEM subjects, especially those who are currently under-represented in STEM careers. He is also the head of outreach and engagement for the department, using his 25+ years of experience of science engagement and education to lead and support staff and research students to organise or take part in hundreds of events to a combined audience of tens of thousands each year. He is particularly keen on collaborative engagement, especially with artists and arts organisations, with projects including collaborations with a Childrens theatre company, a dance group, visual artists, composers and more, prize-winning show gardens, and exhibitions at Tate Liverpool and the London Design Biennale. Finally, he is passionate about in-person engagement, having given hundreds of presentations and workshops to schools and the public including as a Science and Technology Research Council Science and Society Fellow and Institute of Physics Schools and College Lecturer.

Abstracts: Contributed Talks

Diana Powell
CEO, UK Unplugged CIC
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Connecting to Underserved Families: How UK Unplugged made Engagement Work through our Environmental Chemistry Box and Event
<p>What about a game with poo? What started as a chat with the environmental agency about how environmental chemists test soil and help regulate industrial farming, evolved into our much-loved Poo Balance game, appealing to kids and teens, and forming the centrepiece of our Environmental Chemistry Event and Box, where confidence levels soared from 26% to 76% and where underserved families made up the majority of the audience.</p> <p>But how did we get there?</p> <p>In this talk, we're diving into how we connected with our community on the topic of Environmental Chemistry through the Royal Society of Chemistry Community Outreach Fund. We'll look at how we brought together a STEAM team to reach underserved communities, create original content and deliver the Environmental Chemistry Box and Event that were educationally rich, engaging and inclusive.</p>
Jo Trowsdale
Senior Lecturer in Education, Birmingham Newman University
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Art-making and developing 'possible selves' – a STEAM model for HEIs
<p>'Becoming Eco-artists' is a STEAM education project model for KS3 school students to gain older peer insight into HE study (here art and ecology), as well as offering employability experience for HE students in communicating their subject to others beyond their field. This project draws upon research into STEAM curriculum developed through the TAME model (Trowsdale art-making model for education), and with HE student ambassadors focused on STEM and Widening Participation teams, developed by Dr Clare Gartland.</p> <p>Designed by art and biodiversity HE students, HE and school teachers, this project positions HE students as collaborative leaders of a series of half-days sessions, inducting school students into becoming eco-artists, exploring where and how the arts and sciences complement. Students investigate, document, and communicate ideas about biodiversity through expressive visual and technical means. This plan features as part of an Erasmus+ project publication but is adaptable to other subject foci.</p>

Tim Gabriel

Senior Lecturer in Chemical Sciences, Manchester Metropolitan University

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Authentic Outreach and Public Engagement – Your Personal Journey

Over the past twenty years, I have witnessed the advancement of science communication through many different approaches. The fusion of religion, ethnicity, multinational perspectives, art, sports, psychology, and humanities with science, presented in innovative ways, has created opportunities to discuss personal and career topics. While school-based, curriculum-based talks still exist, it is becoming increasingly common—and necessary—to see scientists representing more diverse, less predictable backgrounds and stories. This diversity helps nurture and inspire the next generation. In some cases, scientists can enhance their promotional credentials and dispel social misconceptions, creating more authentic approaches to public engagement.

This talk will explore the possibilities of creating honest, lived, and appealing public engagement experiences.

Emma Nichols

Outreach & Engagement Manager, University of Manchester

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Back to School (Finally!) – University STEM Outreach in the New Normal

Restarting our on-campus, in-person activities with primary and secondary schools wasn't as simple as just dusting off the programme of events that we had to cancel in 2020 and changing the dates. The impacts of the pandemic on schools and universities, teachers and academics, and students of all ages transformed the landscape of university STEM engagement, requiring us to look critically at our strategies and approaches and identifying who we were reaching and what wasn't going to work any more. Drawing on first-hand experiences of six years as a Physics public engagement manager pre-COVID and four years working more broadly across STEM since, I'll take a look at what has and hasn't worked for us – the successes, failures, surprises, and necessary adaptations as we've tried to piece together what effective school-university collaboration looks like in the "new normal".

Ruth Murray

Community Partnerships Manager, Science and Industry Museum

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City Sparks: Co-producing STEM Learning Experiences at the Science and Industry Museum

In 2023 The Science and Industry Museum delivered their first City Sparks programme. Working with 12 organisations and over 180 community participants to co-produce a headline holiday programme at the Museum which was enjoyed by over 27,000 visitors. Together we created installations and displays, pop-up events and activities and memorable learning experiences for both participants and visitors alike. Hear more about how the programme's structure allowed for our co-production and science-capital informed approaches to be scaled up, whilst maintaining our equitable values.

Lorelly Wilson

Director, Chemistry with Cabbage

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Demonstrating Complex Chemical Concepts to a Young Audience

A demonstration of lots of safe chemistry experiments using common household products. These illustrate important chemical concepts and can make quite difficult ideas understandable even to primary age students. 'Recipes' and advice on equipment and chemicals.

Why does sour milk make better scones?

Why does your mum tell you to eat your greens?

Erin Brady

Outreach Leader for Innovate STEM Club, University of Bristol

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Creating a STEM Outreach Programme that Benefits both its Young Attendees and Student Facilitators

This year, myself and Joel Ross have led the Innovate STEM Club (affectionately known as "LEGO Club") which is facilitated by eighteen STEM students at the University of Bristol. Currently, outreach within the Faculty of Engineering tends to consist of one-off events aiming to excite young people from Widening Participation backgrounds. LEGO Club provides a sustained interaction and is based off-site in an area of low progression to university. Additionally, the club aims to provide personal development opportunities available to our helpers.

In the pilot term, we have undertaken an informal Theory of Change process evaluation to identify areas for improvement as well as highlight achievements that will be used to seek future funding. This talk will focus on key features of the evaluation which relate to the programme's sustained presence, and our objective to promote the development of our helpers as well as our young attendees.

Ali Rouncefield-Swales
Head of Research and Evaluation, Institute for Research in Schools (IRIS)
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Independent Research Projects: Supporting Young People's Identity and Aspirations
The Institute for Research in Schools (IRIS)'s mission is to change the culture in education so that every young person can experience real research.) IRIS is a national charity that enable young people to do real research, understood broadly as Independent Research Projects (IRPs) (Bennett et al., 2018). Our mission is to change the culture of education so that every young person can experience real research. However, the impact on students of undertaking such projects remains under-researched. Over the past two years, we have gathered both quantitative and qualitative data regarding students' participation in our IRPs. This session aims to explore the influence our work has had on students' identities in science and underscore the significance of authenticity within genuine scientific inquiry. Additionally, I will explore how involvement in an IRP affords students the opportunity to develop valuable research and transferable skills while gaining a deeper appreciation of the diverse contributions of science. This enhanced understanding and recognition of science helps to increase aspirations for careers in science-related fields.
Carol Davenport
Director, NUSTEM, Northumbria University
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What do we mean by STEAM? The importance of balance.
Defining STEAM can be challenging, with many projects using different methodologies and subjects under the STEAM banner. In this talk we will look at how STEAM has been defined – both explicitly and in practical terms. Through a description of an outreach project which brought together a visual artist, a poet and a solar physics group, we will explore the importance of balancing different disciplinary practices within STEAM. Finally, we will challenge participants to reflect on their own practice in STEAM.

Richard Davies¹ & Jo Trowsdale²

¹ Higher Education Research and Development Lead, University of Central Lancashire;

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Designing learning in partnership with teachers

Key features of valued 'outreach activities' are that they provide benefits both to the school and to the university, and that pupils come to see university as an exciting possibility for them. A further purpose is that such activities have specific attraction and value for students from under resourced backgrounds. In this short presentation we showcase an alternative model to designing learning which meets these criteria.

The TAME model, developed by Dr Jo Trowsdale from research into a five-year arts and engineering project for pupils, enables teachers, with the help of external experts, to develop real-world inspired schemes of work. The model and project has so far been developed with 11 primary schools in the West Midlands. Teachers see it as an engaging and manageable way to design interdisciplinary learning which motivates learners, providing a bounded autonomy, and authentic real-world context which coaches positive learning behaviours, delivers on curriculum outcomes and generates a fascination with science in the real world.

The approach also has a differential aspect on pupils with evidence showing that girls and pupils showing disengagement from school are particularly supported by this approach. The schemes of work have drawn on, for example, the expertise of engineers, environmentalists, town planners, digital artists.

Wendy Sadler

Senior Lecturer/Director, Cardiff University/Science Made Simple

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More than Words - The story of a non-verbal experiment

Is it possible to communicate science if we don't use any words? This was our starting question when we began an experimental journey of developing a theatre show about science phenomena. Through various failures and funding struggles we took the idea to various arts festivals and across 12 countries in Europe and South Africa. Merging physical theatre, classic science demonstrations, an onstage DJ and clowning skills we learnt how to create a show that aims to leave the audience with a hunger for knowledge rather than all the answers. The resulting show (called 'visualise - the beauty of science') went on to tour for a number of years and became 'The Experimentrics' as it became more character focused. In this session I will share what we learned about audiences when you can no-longer rely on the words and discuss how you can't please all the people all of the time!

Mel Lacey¹ and Alexandra Males²

¹ Associate Professor, Sheffield Hallam University

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ChemBoost, Establishing and Evaluating an Online Chemistry Tutoring Programme

ChemBoost is an online tutoring programme running from April 2024-April 2025. It has been designed to support year 12 and 13 students in the South Yorkshire and wider area to consider chemistry degree courses. The programme includes an in-person welcome event where the participants will take part in a practical lab session. Subsequently, there will be online weekly sessions in a 3-week rolling programme rotating between 1) academic staff-led tutorials, 2) self-study sessions and 3) student-led advice sessions. Undergraduate students will act as accessible role models.

Our talk will discuss how we developed and implemented the ChemBoost programme and the challenges we faced. The programme specifically encouraged applicants from widening participation groups and those underrepresented in Chemistry to apply. The demographics of applicants, those selected for the programme and those retained by the programme will be explored, as well as ChemBoost attendees feedback from the first term of the programme.

Debbie Willison

Vice Dean Academic (Faculty of Science) and Deputy Associate Principal (Online Learning and Teaching), University of Strathclyde

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A Lifetime of Chemistry Outreach

Outreach activity for universities is important for many reasons. It supports student recruitment and can enhance the school curriculum. This in turn can lead to supporting teacher development. In STEM, there is almost a moral imperative to help students recognise that a career in STEM is a choice that is open to them. In addition to all of these reasons it is generally really good fun!

In this presentation, colleagues will hear about a range of outreach activities which have taken place at Strathclyde over the last 30 years. This will include events for teachers as well as students. It will also include individual projects such as 'Digging up your Playground' and 'Analysing the H₂O in your School' before moving on to some of our more recent activities: ChemDIVERSE to attract under-represented groups to Chemistry and; ChemSTEP to involve employers and parents in a STEM network.

Rory McDonald

Post-Doctoral Research Associate, Liverpool John Moores University

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Evaluation as an Opportunity, not a Chore

Project evaluation is an important aspect of Outreach and Public Engagement practice that can support learning and document successful impact. However, for its virtues, evaluation is also often a chore for practitioners: drawing on limited resources, requiring skills and workflows that may not align to delivery-focused teams, and adding to workloads during the busiest stages of project development and delivery.

In this talk, I will explore the practical application of project evaluation drawing on work within the Absolute Chemistry Research Group (ACRG) at Liverpool John Moores University (LJMU). The importance of project evaluation, and burdensome characteristics associated with this work, will be explored. Then, a series of recommendations will be outlined to overcome these barriers and transform evaluation into an efficient, effective practice that benefits practitioners and their programmes.

Carsten P Welsch

Professor and Accelerator Science Cluster Leader, University of Liverpool

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Reaching New Audiences through Innovative Public Engagement

Accelerator research is of great value to science, society and industry, but this technology does not traditionally feature in mainstream media, nor is it part of school curricula. Public awareness of how accelerators work therefore remains low despite their importance. To address this challenge, the QUASAR Group at the University of Liverpool has taken a novel approach to public engagement to make the benefits of its research accessible and understandable.

The group's wide-ranging outreach activities and strategic communication have engaged millions around the globe, improved public understanding of accelerator science, triggered public debate and set best practice for science communication. Innovative workshops and events have educated new and underrepresented audiences, raised young people's aspirations towards science, and created award-winning educational content for visually impaired children. This contribution will summarize the QUASAR Group's innovative outreach activities, explain how impact on diverse audiences was assessed and outline plans for the future.

Lightning Talks

Room 2.05	Room 2.06	Room 2.09
Gina Washbourn - The Importance of Outreach in the Chemistry Degree Curriculum	Megan D'Alton – University of Strathclyde/ Glasgow Science Centre	Melissa Whitehouse – University of Liverpool
Mark Roughley – Liverpool John Moores University	Aaisha Patel – Absolute Chemistry Research Group – UNSDGs	Vicky Ellingham – Cost, Science Identity, and Motivation
Steph Bevan – Institute of Physics	Adrian Garcia Burgos – Science is Magic	Anna Kirkham – Using students as outreach performers
Cate Cropper - Outreach and Widening Participation at Faculty of Science and Engineering, University of Liverpool	Rachel Schwartz-Narbonne – Sheffield Hallam University	Kat Presland – Royal Society of Chemistry
Helen Beckett Wilson & Lindsey Metcalf McGrath – MedCan Project: Prescribed Cannabis	Gemma Reed – Public Engagement Officer, Liverpool John Moores University	Sarah Myers – STEM Learning
	Avril Rowley - Liverpool John Moores University	Victoria Brennan – Creating the model for effective outreach