

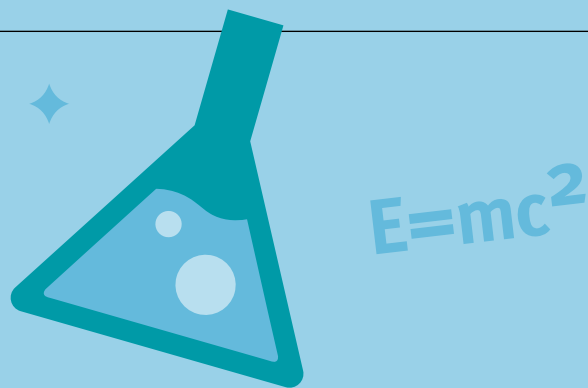
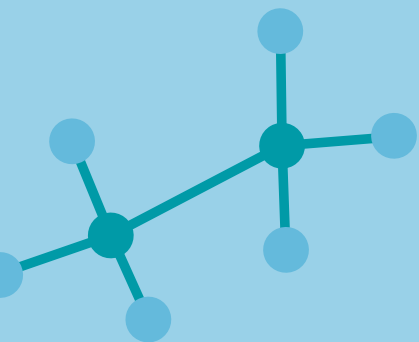


# **Ri**

## **The Royal Institution** **Science Lives Here**

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**Annual Review 2021**



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# Welcome

As we write, we have just completed filming the final episode of this year's CHRISTMAS LECTURES from the Royal Institution.

Our Lecturer, Professor Jonathan Van-Tam, had a live audience again; a routine occurrence that was impossible just a year ago when we were forced to deliver the Lectures behind closed doors for the first time in nearly 200 years. So it was wonderful to see the iconic Ri theatre filled with excited young people engaging with science, just as it has been in the past and just as it always should be.

We had to work far harder than usual to make the Lectures a theatre experience as well as a television broadcast, and in many ways these three nights in mid-December represent our entire experience in 2021.

As a small, independent charity the course of the year has been very challenging again, as it has for so many organisations throughout the UK and around the world. While we remain financially stable, our income has been severely impacted again and it has been necessary to take on additional debt to cover the operating costs of the Ri. In October, we reported a deficit for the third financial year in a row. So many of our activities are face to face and some of our audiences, understandably, have been reluctant to return to the Ri. Like everyone else, we are conscious that there is still much uncertainty surrounding Covid and the current impact of the Omicron variant.

Yet thanks to the dedication of Ri staff, Trustees and volunteers, and the continued, vital contribution of our supporters, we have been able to run many of our charitable engagement activities at pre-pandemic levels.

We returned to live events in our theatre in August and have enjoyed sell-out audiences for talks from the ever-popular Ri-favourites Hannah Fry, Adam Rutherford and Andrew Szydlo. Our L'Oréal Young Scientist Centre began taking school bookings for hands-on explorative workshops in October, and we are close to being fully booked well into the middle of next year. With generous philanthropic support, we will be sending more of our professional science presenters than ever before, on fully-funded visits to schools in disadvantaged areas throughout the UK.

At the same time, we have built on new, pandemic-driven innovations such as our popular livestream talks, watched by over 40,000 people during the year, which have increased our reach and made the Ri more accessible. Our YouTube channel, already successful, broke the one million subscribers level in April and continues to grow exponentially.

So as 2021 draws to a close, these are just some of the highlights that we reflect on throughout this Review. We must record our thanks to all those who have contributed to the Ri throughout the year, without whose support we would not have been able to engage so many people with science.



**Sir Richard Sykes**  
Chair  
The Royal Institution



**Lucinda Hunt**  
Director  
The Royal Institution



# Our impact

Our vision at the Ri is for a world where everyone is encouraged to think more deeply about science and its place in our lives. Our values dictate that we live science and love science, that we discover together, dare to question and demand diversity.

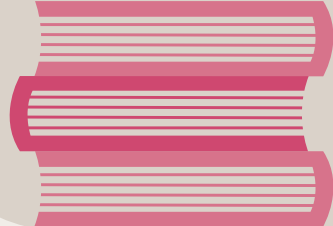
So from the young Cuban student with technology that will only allow one download of our CHRISTMAS LECTURES archive per week, to the scientist of the future who gave our Masterclasses nine stars out of five, feedback from our participants and supporters clearly demonstrates our impact. In spite of another difficult year...

‘The class were buzzing afterwards. They felt really excited about what they had just engaged with.’

Teacher, Ri Masterclasses

## Science in Schools

# 373



grants for free school visits, 100% of which went to the most disadvantaged schools, special schools and pupil referral units

## Masterclasses

# 40

years of Ri Masterclasses, with 100,000+ students



‘Causeway is very proud to have worked with the Ri in turning an idea into a Computer Science Masterclass programme that has provided opportunity and challenge to thousands of curious young minds all across the UK.’

Phil Brown, CEO, Causeway Technologies

## Livestream talks

41k

attendees of an Ri livestream talk, many of whom would never be able to come to a live talk in our theatre

‘The @Ri\_Science live show – a perfect way to recap on all that lockdown learning.’

Teacher, Ri Science in Schools

## Young scientists

6k

students who engaged with online workshops and livestreams with our LYSC team

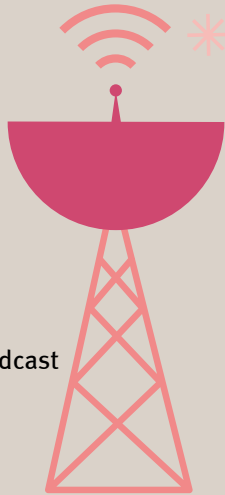
‘It was AMAZING! Dan pitched it perfectly for our kids, they were so excited having been in lockdown. The overlap with the curriculum was spot on.’

Teacher, Ri Science in Schools

## Podcast

30k

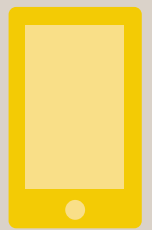
downloads for six new Ri podcasts broadcast during the year



## Social media

100k

followers on Twitter, and a 20% increase in followers on Instagram



## ‘Nine stars!’

Participant, Ri Masterclasses (approval rating where five stars – “really enjoyed it” – was the highest)

## CHRISTMAS LECTURES

3.3m

viewers of the CHRISTMAS LECTURES with Jonathan Van-Tam; versus 2.02 million in 2020

‘I’m a Cuban young person, I work for 20 dollars per month, my cellphone and my computer are really old, but I can see your CHRISTMAS LECTURES. Your Lectures are the reason why I studied and keep studying

Viewer, Ri CHRISTMAS LECTURES

## Science in Schools

42k

children engaged through Science in Schools, versus 28,000 the year before



## Science in Schools

# 25%



more applications for free Science in Schools visits than in the most successful pre-Covid year

‘How much I have enjoyed the livestreams during lockdown; truly they have kept me sane. I was so pleased you are keeping them going after the Ri building has opened again.’

Attendee, Ri Livestreams

## Heritage

# 65



Humphry Davy notebooks being transcribed for the first time, through a mass public participation project

‘Thank you for continuing to fuel the dreams of my son.’

Attendee, Ri livestreams

## Online shop

# 2.6k



visitors to our new online merchandise store, with over 160 product lines

‘Three generations of our family have greatly enjoyed the CHRISTMAS LECTURES over a number of years. We are so pleased to be able to support the Ri with its incredible work to inspire young people in the fields of science and engineering.’

Charlie Harris, Trustee, The McGreevy No. 5 Settlement

## YouTube

# 1.14m



subscribers to our YouTube channel, with nearly 200,000 new subscribers in 2021

‘Your presenter had a wealth of knowledge and really got the children thinking. Everything was explained clearly at the correct pitch and it was great for the children to meet a scientist.’

Teacher, Ri Science in Schools

## Energy

# 100%

use of renewable energy sources at the Ri in 2021

**Next page:** Plenty of eager volunteers for another CHRISTMAS LECTURES demo











**Science at  
the Ri**

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# Public talks

## live at the Ri or live in your lounge

Physicists Carlo Rovelli and Sean Carroll, mathematicians Hannah Fry and Sir Roger Penrose, neuroscientist Anil Seth and psychologist Nichola Raihani. Journalists Carl Zimmer and Angela Saini, immunologist Dan Davis, astronaut Nicole Stott and molecular biologist Beronda Montgomery.

These are just some of the world-leading scientists and cultural commentators who, throughout the year, continued the two-centuries old tradition of revealing their cutting-edge science to a public audience at the Royal Institution.

We learned with them, through a series of fascinating journeys into everything from the Big Bang and Gigafactories, to dark matter and, quite literally, 'The theory of everything.' For our family audiences there were lessons on how to build a satellite, a deep dive into black holes and insights into a career as an astronaut. We also enjoyed discovering together, why everything we know about dinosaurs is wrong!

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**'Our popular programme of livestreams is making us more accessible, bringing new audiences to the unique brand of Ri science.'**

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Some of our speakers were live in our theatre, while most, for obvious Covid reasons, spoke 'at the Ri' from the comfort of their own homes. Yet whatever their location and whatever their scientific discipline, a critical examination of science and the way in which it shapes the world around us remained a constant theme.

Despite our world-famous theatre being closed to public audiences for only the second time in our history, and the first since the height of WWII, we maintained a programme

of at least two public talks every week, notably through 83 livestreams watched by more than 40,000 people around the world. A product of lockdown and as one participant put it, 'the only good thing to come out of Covid', our popular programme of livestreams is making us more accessible, bringing new audiences to the unique brand of Ri science. We remain grateful for the generous donation from Ron Freeman which helped make the launch of our livestreams possible.

In September we re-opened our doors to a public audience and enjoyed sell-out events by Ri favourites Hannah Fry and Adam Rutherford and the ever popular – and ever explosive – Andrew Szydlo. We were pleased to run the full spectrum of events, from livestream only, to theatre only, to a new hybrid combination of the two.

We are grateful to all those who have helped make our livestream and theatre talks such a success during the year, from the Faraday Institution and Grantham Institute who so generously supported events, or helped curate such fascinating and topical series, to all those who simply took the time to attend.

We have learnt lessons from the pandemic. We have invested in new technology, while being responsive and adapting to change. At the same time, a host of new scientists have spoken at the Ri for the first time, bringing a greater diversity of voices, and will no doubt be back.

Our public talks in the year ahead, our mix of speakers – and our audience of adults, young people and families – will be all the richer and more diverse as a result.

# The view from the Ri

## Peter Gallivan, Family Programme Manager

*As we're a small team at the Ri, Pete is one of our 'go-to' members of staff when some science needs organising. He was last seen as the dastardly red-coated virus breaking into the Ri cell during the 2021 CHRISTMAS LECTURES. And remained unseen as the front half of a pantomime cow...*

I'm Pete and I'm the Family Programme Manager here at the Royal Institution. My job is very varied, but in general I put on a range of different events to give families and young people an exciting hands-on experience of science.

I've always been fascinated with science, and especially the natural world, so I love being able to give thousands of young people every year the opportunity to discover how amazing science can be. I find there is nothing more rewarding than the look of amazement in someone's eyes when they see one of our creative and explosive science demonstrations, and the lasting positive effect experiences like this can have.

In a normal year, most of my time is spent arranging events in our building. This means finding interesting speakers, designing hands-on activities and managing all the logistics. Family Fun Days, in particular, are complex events, but worth every minute spent on organising them when you see children enjoying science together with their parents and siblings.

Of course, 2021 was far from a normal year, but we still managed to keep engaged with our family audience, through regular try-at-home activity sheets sent to young members, and livestreamed science talks. I also had time this year to work on some other projects for young people, from continuing our regular science Q&A column in The Week

Junior's Science+Nature magazine, to writing some science books which are due to be published this year.

However, since our foundation in 1799, live demonstrations of science in our theatre have been at the core of what we do. They are what makes us unique, and one of the best ways we can ignite a passion for science in young people. It was therefore an emotional day when we finally returned to having a live audience in our building in August.

**'They are what makes us unique, and one of the best ways we can ignite a passion for science in young people.'**

As we look to 2022, I am excited to get back to more in-person activities, and continue the legacy laid down by Davy, Faraday and all the other amazing scientists who worked in this historic building.



**Right:** Pete's star turn as a CHRISTMAS LECTURES virus  
**Next page:** There's nothing standard about our standard model t-shirt, nor our limited edition CHRISTMAS LECTURES merchandise range







# CHRISTMAS LECTURES

## Tonight Jonathan, you're going viral

Nothing connects the Ri's present with its past in quite the same way as the CHRISTMAS LECTURES. Begun by Michael Faraday in 1825, with the exception of a brief period at the height of WWII they have been delivered every year since.

They were the first science programme broadcast on UK national television, in 1936, and have been broadcast every year since 1966, making them the longest-running science TV programme for children in the world.

We believe Michael Faraday would recognise them today, yet they are different of course; more topical, full of explosive demos to visually convey complex scientific principles, and with a national and international audience he could only have dreamt of. After nearly 200 years the CHRISTMAS LECTURES remain the centrepiece of the Ri's science engagement with young people.

For this year's Lectures with England's Deputy Chief Medical Officer Jonathan Van-Tam, we were pleased to welcome a live audience back to the Ri. The unmistakeable hubbub of the Ri full of excited children, eager anticipation in the queue snaking round the building, and plenty of willing volunteers to help with the Lectures' trademark demos.

They, and the 3.3 million viewers on BBC Four and iPlayer – versus 2.02 million in 2020 – were taken on a deep dive into the world of viruses, revealing why advances being made during the pandemic mean science will never be the same again.

As Jonathan said, it was a unique opportunity to 'level' with our audience of young people, who have been affected by the pandemic like no other demographic, about what had happened to them over the preceding 18 months.

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**'After nearly 200 years the CHRISTMAS LECTURES remain the centrepiece of the Ri's science engagement with young people.'**

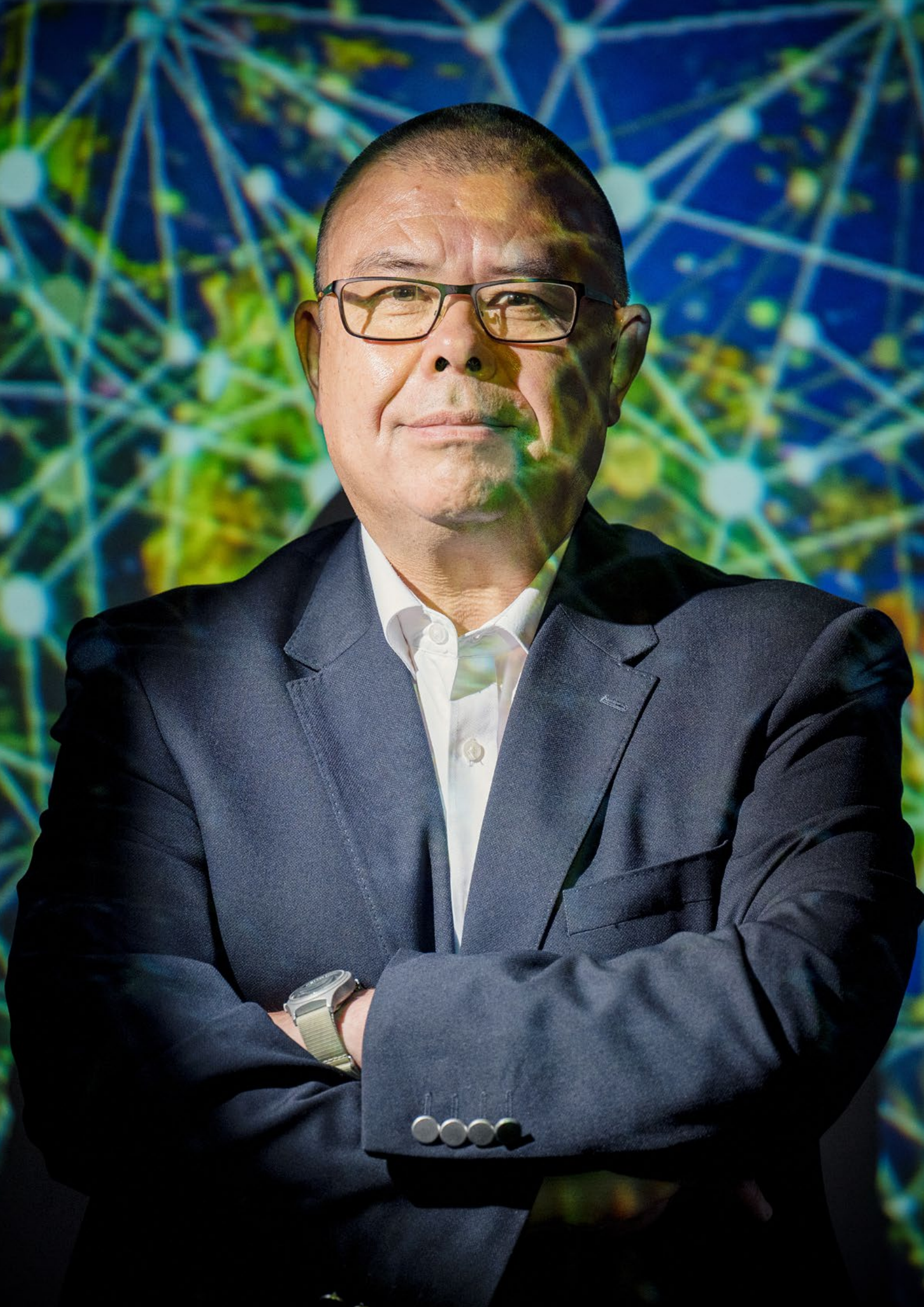
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With six expert scientists who are all playing a vital role in the UK's response to the pandemic, joining Jonathan as Guest Lecturers, there was a strong message of the power of collaborative science. And it was a hopeful message, of how our scientific response to Covid-19 will have benefits for society long after the pandemic has ended.

As ever, we are grateful for the generous contribution of our CHRISTMAS LECTURES supporters – in 2021 the UKRI and the Reckitt Global Hygiene Institute – to our Guest Lecturers, and of course, to Jonathan, who donated his Christmas Lecturer fee to the Blue Dragon Children's Foundation and the Children's Bereavement Centre.

Not only did their collective commitment enable us to produce the Lectures, but also to extend the national conversation about the application of science in our lives, into homes and schools across the UK in the year ahead.







# L'Oréal Young Scientist Centre

## Following in Faraday's footsteps

Where better to get hands-on with science than just metres away from where world-famous scientists such as Faraday, Lonsdale, Tyndall and Davy did the same?

Faraday's scientific knowledge and skills were self-taught, yet he became the greatest experimental scientist of his generation. His story demonstrates that everyone can make their mark in science regardless of their background. We believe this is an important message for the young people who visit our L'Oréal Young Scientist Centre (LYSC), in the heart of our free museum, right next to Faraday's own laboratory.

And at the centre of our curriculum supporting LYSC workshops for 7-18 year-olds, we are focused on demonstrating the scientific process of exploration, equipping our young people with the confidence to ask questions, to develop and test theories, just as real research scientists do.

This year was particularly challenging again for our LYSC team, with the LYSC lab remaining closed for much of the year. We are grateful to L'Oréal UK and Ireland – in the 11th year of our partnership with them – for their continued support throughout the pandemic.

**'His story demonstrates that everyone can make their mark in science regardless of their background.'**

With the normal programme of face-to-face workshops impossible, the LYSC Team focused on careful preparation for a return to live events and developing new sessions to be delivered live online, retaining the real-time interaction that

the many pre-recorded workshops available are unable to replicate.

Throughout the year we delivered six online workshops to 4000 students from the Girls Day School Trust and livestreamed a science spectacular to 1000 year 3 to 6 children live from our theatre. We were pleased to be able to deliver eight shows in our theatre to live audiences during the summer holidays, and a further three live sessions for Ri Young Members and their families.

The LYSC re-opened for live sessions in September and we quickly saw bookings into 2022 pick up to almost pre-pandemic levels; a clear signal of the value teachers place on the LYSC's support for science education in the classroom. Omicron and other new variants permitting, we look forward to building on that appetite for our particular brand of Ri science in the year ahead.



**Right:** Hands-on exploration at the LYSC, just like real research scientists

# An important place in the history of science

Our collection of scientific apparatus, books and papers is recognised as internationally significant. Humphry Davy's notebooks, in particular, are inscribed on the UNESCO Memory of the World. We have the world's largest collection of artefacts relating to Michael Faraday; while individual items range from the world's first electric motor, to the apparatus used to establish the principles of global warming.

Somewhat uniquely, every item has a direct link to science undertaken at the Ri. And with the exception of loans to other museums, and periods of storage, most have never left our home in Albemarle Street. In all they are an important representation of the UK's rich history of scientific advance.

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**'Using the power of crowd-sourcing platform Zooniverse, anyone, anywhere in the world can be involved.'**

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We are proud to preserve our collection on behalf of future generations; to make items available to view, by people of all ages and backgrounds, in our free museum; and to keep the archive alive, constantly enhancing it with a record of the Ri's activities today.

Throughout 2021 we continued an essential programme of collection care and management, opened the archive to researchers and academics, and shared our heritage with public audiences through the commemoration of significant anniversaries and partnerships with other institutions. In February, we began an ambitious project to transcribe the entire collection of Humphry Davy's notebooks, in partnership with Lancaster University and funded by the Arts and Humanities Research Council. Using the power of crowd-sourcing platform Zooniverse, anyone, anywhere in

the world can be involved. Together we will give important insights into this great scientist's research methods, preserving his inner-most thoughts on behalf of the nation and making them available to researchers around the world.

In September we began a year-long series of activities – due to include films, exhibitions and live theatre events – marking the 200th anniversary of the development of the electric motor, by Michael Faraday, in his basement laboratories at the Ri. And in December, we announced three new Freer Prize Fellowships for outstanding final year History of Science PhD students, awarded through international competition for the first time.

We look forward to continuing to share the Ri's, and the UK's, rich scientific heritage with the world in the year ahead.





# The view from the Ri

## Charlotte New, Head of Heritage and Collections

*Every new starter at the Ri agrees that the highlight of the induction programme is the tour of our archive. It's 50% the eclectic mix of fascinating artefacts and 50% the passion and knowledge of the collection's Curator. One of Charlotte's inductions gets scheduled for an hour; it invariably takes at least two!*

The collections of the Ri are a wonderful mix of scientific, cultural, and personal artefacts and fully encompass the 223-year history of our Institution. They are intrinsically linked to the development of the Ri's ongoing mission of public engagement with science, while the building in which they are housed was, for most items, the place where they were created. The collections themselves are a living history, being added to by our current activities, while individual items are still used by our science communicators today. In all our collection helps cement the Ri's status as the home of science communication.

As Head of Heritage and Curator of our collections, I have the privilege of being temporary custodian of these wonderful objects and archival documents, dipping into the wealth of knowledge that they hold, to answer internal and external questions relating to the development of scientific discoveries in Great Britain.

These discoveries have shaped the world and while many items are widely recognised, such as Michael Faraday's first electric motor (1821), there is an immense amount of lesser-known material which is equally fascinating: the private correspondence of Ri figures, including Faraday's letters to his favourite niece offering marital advice, the membership certificates of Humphry Davy which include two signed by

early American Presidents Thomas Jefferson and Quincy Adams; and Faraday's original watercolour paint box with its blocks of paint still intact.

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**'I have the privilege of being temporary custodian of these wonderful objects and archival documents.'**

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It is these elements of our collections which still yield surprises, supporting rediscovery through enquiries to the Heritage Team by academics and TV production companies, or participation in external history of science research projects, loans, public tours and display in our free museum.

So while much of my time is spent undertaking painstaking behind-the-scenes collections management tasks – such as cataloguing, cleaning, research and preventative preservation – I am working every day, to ensure all the collections survive for future generations to discover and enjoy.



**Right:** Charlotte with Sophie Scott during the 2017 CHRISTMAS LECTURES

**Next page:** Prof Katie Ewer, one of six Guest Christmas Lecturers to demonstrate collaborative science







**Ri**

**Science through  
UK outreach**

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# Science in Schools

## Creating a sense of wonder and excitement

As the largest provider of school science shows across the UK, a visit from the Ri never fails to create a buzz of excitement among the young audience. It's not every day 'the man or woman from the Ri blows things up in the school hall.'

Our Science in Schools Programme (SiS) is designed to create a sense of wonder and excitement for science in primary school pupils; while for secondary pupils we seek to sustain an existing passion or re-ignite one which may have waned. In all our Programme creates an opening to the possibilities of science; a curriculum-supporting foundation on which teachers can build.

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**'Every state-funded and special needs school is eligible for a free, fully-funded Ri Science in Schools Day.'**

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Having moved quickly during the pandemic to formulate Covid-safe protocols that would allow us to re-introduce in-person school visits as soon as lockdown was lifted, in 2021 we invested further in development, training new presenters and creating and updating show content.

From the second half of the year we began to see the results of this timely investment and preparation. Although schools were initially, understandably, reluctant to commit to a booking, June 2021 saw us deliver more shows in a single month than at any time in the history of the Programme; a 20% increase on the previous busiest month on record. As one teacher put it, a Science in Schools visit is 'the perfect way to re-cap on all that lockdown learning.'

In all, our SiS presenters visited 192 schools across the UK, engaging 57,600 children with science, versus 28,000 during the previous year. Well over 2000 teachers received continuous professional development. And although the number of schools visited was slightly lower than the last full year before the pandemic, the majority took place in the second half of the year, making that too, the busiest six-month period since the Programme began.

And as every state-funded and special needs school is eligible for a free, fully-funded Ri Science in Schools Day, with the generous contribution of our supporters – the Gillespie Endowment, Bain Capital Children's Fund Europe, the Clothworkers' Foundation and the Kusama Trust UK – we were able to run two rounds of applications during a single year for the first time. In total, 783 applications were received, with the second round over the summer seeing a 25% increase on the most successful pre-pandemic year.

Of the 373 schools due to receive a visit as a result, all are in the lowest 40% of deprivation according to the Income Deprivation Affecting Children Index, or have identified pupils with additional needs for STEM education support.

We thank our supporters for enabling this significant contribution to the Ri's charitable purpose and look forward to creating a buzz of anticipation in more disadvantaged schools.

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**Right: Sparks fly in a typical SiS demonstration**





# The view from the Ri

## Mike Cutts, Science Content Developer

*Developing visuals for the CHRISTMAS LECTURES is like painting the Forth Bridge, but when he's not busy building giant lateral flow tests, Mike is recording videos and developing Science in Schools content. At the heart of them all is the world-famous Ri demo.*

Hearing my mother's stories of growing up in a tiny village in central India, surrounded by exotic wildlife, started my passion for science and the limitless marvels of nature.

And when I watched David Attenborough's 1973 CHRISTMAS LECTURES, I entered the Ri's rich and wonderful world of science, delivered by the best experts using incredible demos, all from the famous theatre I now call my office! Here we have celebrated world firsts, explored moon landings, put neuroscience under the microscope, spent time understanding bitcoin, and delved into a thousand other disciplines and subjects, every presenter proudly adding to the prestige of our 200-plus years of science communication.

**'This is the power of the Ri, bringing important ideas in science to the widest audience possible. Never has this been more important than now.'**

An important part of the CHRISTMAS LECTURES is making demos that are interesting on TV and also for the live audience, and we do this every year.

This is the power of the Ri, bringing important ideas in science to the widest audience possible, and utilising our rich heritage of visual demonstrations, passionate scientists and communicators alongside engaging narratives to

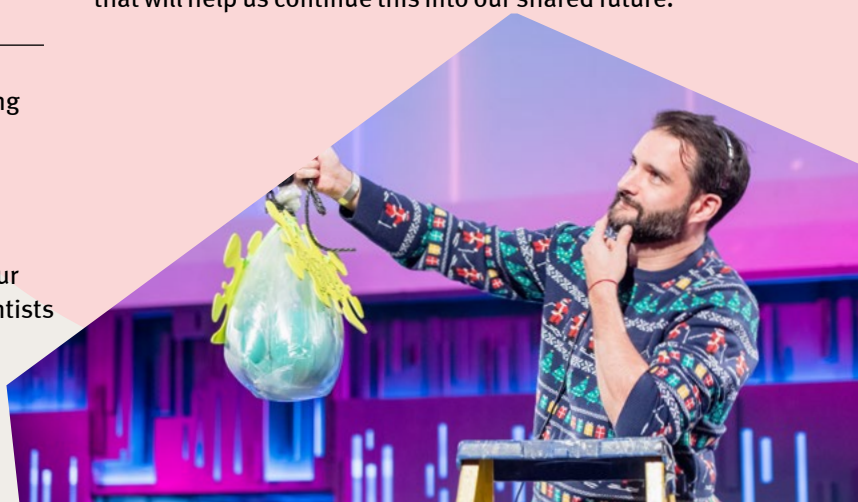
explore subjects clearly, while also in depth.

Never has this been more important than now. Our 2021 Lectures brought together scientists from all disciplines to explore the history, present day and future of medicine. We explained how Covid-19 testing works with an amazingly successful giant lateral flow test (did you spot that the giant QR code actually worked?!), turned the theatre into a giant cell factory (I was the ribosome!), performed the mathematics of infection and most importantly, showed how the scientific community has come together globally to begin fighting back against Covid-19 in such an amazingly short time.

We find ourselves in a period of global confusion, especially towards trust in science. Our ability to bring scientific leaders together and explore the science of Covid-19, objectively and methodically, using clear visual explanations is critical in helping people understand better the ways we are tackling the virus.

By explaining the science, we help everyone move forward together, confident in the latest developments across all disciplines. The Ri was founded to do this, and I am so proud to be amongst such passionate and wonderful colleagues that will help us continue this into our shared future.

**Right:** Mike in his natural habitat - holding a bag of gunge



# Ri Masterclasses

## A new (digital) life begins at 40

For the past 40 years, Ri Masterclasses have made Saturday mornings special for well over 100,000 young people across the UK.

A national programme, led by inspirational experts from academia, education and industry, they represent an opportunity for keen school students to add depth to their school learning in mathematics and computer science alongside like-minded peers.

Equations are solved, processors are built, and friendships are made. Our young Masterclasses alumni have their eyes opened to the scope, relevance and potential of these world-shaping subjects.

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**‘We look forward to working with our funders in the year ahead to embed online Masterclasses as a way to reach larger and more diverse audiences.’**

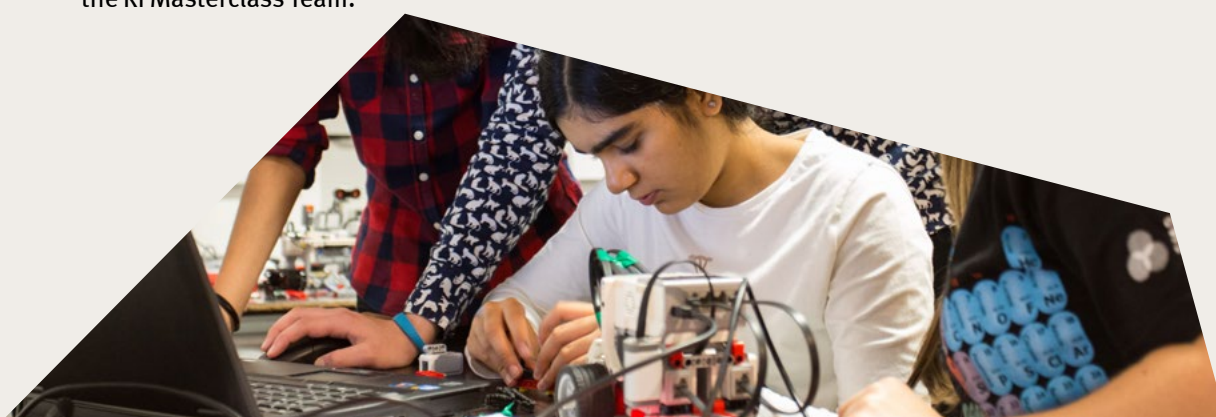
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For much of 2021, the pandemic made practicalities of running a normal programme – with its commitment to repeat attendance at face-to-face workshops – virtually impossible for our network of volunteers. Many turned to online Masterclasses under the watchful eye of the Ri Masterclass Team.

And so the year became one of re-imagining, with our newly developed online Masterclasses launching in January. By the end of the year nearly 70 online and face-to-face Masterclass series had been delivered. Over 2800 students completed the programme and can now proudly call themselves Ri Masterclasses alumni as a result. Fears that student engagement online would fall relative to in-person sessions were allayed by the positive feedback we received.

We are grateful for the continued generous contribution of the Kantor Charitable Foundation, Causeway Technologies and Clothworkers’ Foundation who supported the move to this new world of virtual Masterclasses, and enabled us to continue meeting our charitable objective to encourage everyone to think more deeply about science and its place in our lives.

And as with other Ri activities, a move to online delivery has opened a world of possibilities. While we were pleased to return to face-to-face sessions for the autumn term and plan to retain these at the core of our work, we also look forward to working with our funders in the year ahead to embed online Masterclasses as a way to reach larger and more diverse audiences.



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**Left:** Another special Saturday morning at an Ri Masterclass  
**Next page:** A fiery Science in Schools demo by one of our newly trained presenters



The Royal Institution  
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# Doing more science together

At the Ri we believe strongly in the power of partnerships; sign-posting people to the many and varied places where they can engage with science. We can do so much more, and reach so many more people, if we combine our charitable engagement with networks of other like-minded organisations. So we have worked hard throughout the year to add value to opportunities to discover science at the Ri by maintaining and creating partnerships.

We continued to work closely with the London Mayor's London Scientist Programme and while opportunities were limited by Covid restrictions, we were pleased to be able to offer free tickets to the CHRISTMAS LECTURES filming to children from their network of 1500 disadvantaged schools.

Also with the London Mayor, this time with the Environmental Engagement Team, we hosted a cleantech taster day, showcasing the possibilities of a career in science dedicated to tackling the climate crisis, to 300+ students about to make their GCSE choices. Cleantech start-ups from a Centre for Climate Change Innovation (CCCI) – another major partnership we established in 2021 – provided the inspirational content for the day, timed to coincide with COP26 in Glasgow.

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**'We were pleased to be able to offer free tickets to the CHRISTMAS LECTURES filming to children from the London Mayor's network of 1500 disadvantaged schools.'**

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With Imperial College London we were the founding partner of a CCCI, to accelerate the development of cleantech solutions to the climate crisis and support start-up companies in turning their innovations into viable products for deployment worldwide. The Centre will be based at our historic home in Albemarle street, with the Ri contributing public engagement expertise.

Since its launch in March – with an online address to over 2000 people from our Royal Patron HRH The Prince of Wales – we have been working to identify funders, cleantech innovators and other supporting stakeholders to tackle the greatest challenge facing humanity today. The first cohort of 15 start-ups to benefit from its accelerator programme was established in May.

During the year we also worked with the charity Spark, dedicated to supporting students from disadvantaged areas of the UK to go to university, and continued to support the Pseudoscience Group in tackling the rise of misinformation, particularly online, which is undermining public trust in evidence-based science. We are grateful to the Open Society Foundation for grant funding, which we are administering on the Pseudoscience Group's behalf, in support of projects ranging from an examination of drivers to consume misinformation on social media platforms, to the weaponisation of politics in Eastern Europe.

We also strengthened our long-standing partnership with STEM Learning, developing a suite of curriculum-linked resources for schools and home educators while planning for the distribution of our annual schools' debate kit through their STEM club network to increase the impact beyond the schools we are able to reach alone, and to integrate our continuous professional development for teachers with their own.

Through these partnerships and others like them, we are able to sustain and nurture individual and community interest in science, in places worldwide where the Ri does not have a permanent presence. We look forward to working ever more closely with our partners in the year ahead, while seeking new collaborations to help achieve our vision.









**Science around  
the world**

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# Creating a sense of wonder and excitement

Among the hundreds of supportive comments we have received in response to our popular, twice-weekly livestream talks, are insights into the beneficial impact they have had on those who have felt most isolated during the pandemic.

‘Truly they have kept me sane,’ said one; ‘The one good thing to have come out of Covid,’ and ‘They have done our mental health no end of good,’ said others.

While just one example of our varied activities, our livestreams are testament to the power of digital to extend our reach beyond our historic home in central London. Through our digital channels we are engaging new audiences, making the Ri more accessible, and creating opportunities to discover and discuss science, for everyone, at anytime, anywhere in the world.

For this reason, we grew our Digital Team in 2021 and, thanks to the generosity of one of our supporters, invested in new A/V technology to support our livestream capacity. We carefully created bespoke content – new videos, podcasts and blogs – while supporting the digitisation of wider Ri activities such as our annual Youth Summit.

While our annual tradition of taking the previous year’s CHRISTMAS LECTURES to an international audience via live events in Hong Kong, Japan and Singapore wasn’t possible, our Digital Team produced bespoke online content for the annual Croucher Festival in Hong Kong – helping to bridge the gap between scientists and younger audiences. While through our contribution to the Big Bang Fair Digital in June, we reached thousands of 11-14 year-olds and maintained our support for the Big Bang Fair for the fourth year in a row. In April, our popular YouTube channel broke the 1 million

subscriber mark and continued to grow exponentially, adding a further 140,000 subscribers in the remaining eight months of the year. We uploaded over 70 new videos to build on our channel’s total of 138 million video views.

**‘Our livestreams are testament to the power of digital to extend our reach beyond our historic home in central London.’**

At the same time, our Instagram followers grew by 20%, Facebook by 17% and Twitter by 10%, while our six new podcasts released during the year have been listened to 30,000 times. And in the spirit of constant innovation and to help grow our reach among younger audience we launched an Ri presence on TikTok and began creating content for YouTube Shorts.

Building on this successful year, we will continue to further people’s lifelong journey with science through our digital channels in 2022, notably with the launch of a new website early in the new year, made possible by two generous charitable donations. With continued support, we will use the power of digital to engage ever larger and more diverse international audiences with the transformative potential of science.

**Right:** More amazement and wonder from Science in Schools





# The view from the Ri

## Daniela Valla, Social Media Manager

*Social media offers an almost infinite world of possibilities for reach and engagement, but you need to have an expert hand on the keyboard to make the most of it. Since joining in March 2021, Daniela has driven a double-digit growth across our social media platforms and has grand plans for 2022.*

My name is Daniela and I'm the Social Media Manager at the Royal Institution. It's my job to keep on top of the ever-changing social media landscape and create engaging content that inspires people to think more deeply about science and its place in our lives.

**'The internet has always been a great source of educational material for me. I'm delighted to stand on the other side and create content that is going to delight and inspire people.'**

This could be an interesting post about the historical heritage of the Ri, a video explaining a mesmerising chemical reaction, or a fun TikTok short video that will reach young people in a more informal, playful setting.

I'm also the first point of contact for people reaching out to us through social media, answering questions and engaging in conversation with our online audience. My average day involves regular checks to make sure folks aren't left waiting for an answer for too long, while I work on producing content – either adapting something from our vast video library, or

producing new material with our Multimedia Team. What I know about STEM is largely self-taught, as it just happened to be something that wasn't encouraged when I was growing up. The internet has always been a great source of educational material for me, as a teen and an adult, so I am delighted to now stand on the other side and create that content that is going to delight and inspire people.

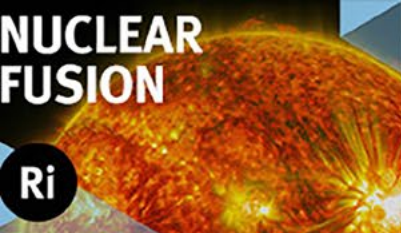
In 2021, our social media posts were seen 61 million times, and gathered 3.6 million interactions.

This rate of engagement is much higher than the industry benchmark for non-profits, which tells me that there's a strong desire by the public to learn more about science and how it relates to the world around us. That's why social media is so important to us at the Ri and I am really excited about the potential to grow our reach with younger demographics, create content more tailored to what our audience responds to, and inspire even more people!



**Right:** The face behind @ri\_science, Daniela Valla  
**Next page:** Just a fraction of the thousands of hours of Ri science to be watched on YouTube. Anytime, by anyone, anywhere in the world.





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THE PATTERNS OF THE UNIVERSE

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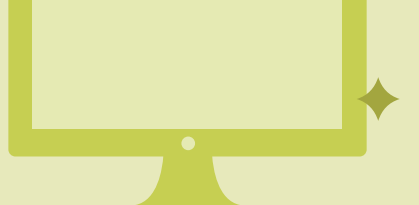
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VISUALISING DATA

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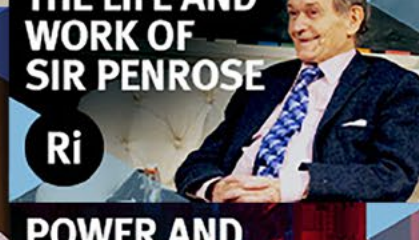
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OTHERWORLDLY LIFE

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# Preparing for post-pandemic growth

With the Ri closed to public visitors for much of the year, and with the majority of our staff working remotely, we have used the time wisely. We have focused on undertaking maintenance activities that are more difficult when the building is full, adapting our IT service to meet the needs of remote working and online delivery, seeking out collaborations, updating our policies and reviewing our structure.

Our Venue Hire Team, with business all but ended due to the necessary Covid restrictions, uncertainty and corporate reluctance to commit to bookings, focused instead on relationships and engagement, filming for clients, and raising our profile as a prestigious venue via a new website.

In summary, we successfully adapted external delivery to continue our public engagement activities online, while behind the scenes much of 2021 was spent preparing for the return to in-person events which duly came from August onwards.

We are grateful to our staff and our volunteers – albeit with opportunities for in-kind support much reduced during the year – for the dedication and fortitude they continue to show in helping the Ri to navigate these unprecedented times.

Despite the impact of the pandemic, we were pleased to be able to make progress on two business priorities – to improve equality, diversity, inclusion and accessibility (EDIA) at the Ri; and to make a greater contribution to environmental sustainability.

At our AGM in April, Ri Members approved changes to the Nominations Committee terms of reference to include a responsibility for promoting EDIA in Board and Committee memberships. An Ri Trustee was appointed with specific responsibility for EDIA, while we de-gendered our two-centuries old Byelaws and other governing documents. Operationally, we partnered with Stonewall to make EDIA training available to everyone who works at the Ri, and our

staff instigated EDIA Group continued to meet regularly throughout the year.

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**‘We were pleased to be able to make progress on two business priorities – to improve equality, diversity, inclusion and accessibility; and to make a greater contribution to environmental sustainability.’**

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We continued to support schools in our disadvantaged schools network, with free tickets to the filming of the CHRISTMAS LECTURES and carried out more free Science in Schools visits than ever before. Our museum re-opened in October and remains free for people of all ages and backgrounds, while all three of our first Freer Prize Fellowships to be awarded through open competition went to final year PhD students from under-represented communities.

In the year that we established a new partnership through a Centre for Climate Change Innovation, we also made progress against our 2018 commitment to reduce energy consumption by 10% each year. Changed working patterns for service contractors to reduce out-of-hours energy consumption, campaigns to remind Ri staff and tenants to turn off electrical equipment and greater use of low energy lighting, all monitored via weekly energy reviews, all contributed to a significant reduction in consumption. Despite use of the building increasing by 60% when Covid-restrictions were lifted, we successfully held the consequent increase in energy use to just 20%; while our electricity supply contract is now based on 100% renewable sources.

As we look forward to returning to a full programme of engagement activities in 2022, we are committed to furthering our success in these vitally important areas of life at the Ri.

# The view from the Ri

## Jemma Naumann, LYSC Manager

*Having jetted half-way round the world to join the Ri as a lab assistant in 2015, Jemma was promoted to manager of our L'Oréal Young Scientist Centre in early 2021.*

In the L'Oréal Young Scientist Centre (LYSC), no two days are the same. From presenting hands-on interactive science workshops to young people, to developing explosive demonstrations for theatre shows and livestreams, my job as the LYSC Manager is never boring.

**'A personal highlight of mine is when the same students return and you can see them developing their scientific confidence.'**

Each year, we present workshops to over 4,000 students aged 7 to 18, engaging them with a variety of lab sessions exploring Chemistry, Physics and Biology.

For primary-age students, a visit to the Ri is often the first time they've had an opportunity to be in a scientific laboratory, and they absolutely love the experience of wearing lab coats and experimenting with real scientific equipment. There's also the opportunity to see science in the context of the world around them, for example by making their very own bath bombs, learning what acids and alkalis are, and all the while connecting these experiments to their own knowledge and observations.

Secondary-age students use scientific equipment they may not otherwise have the chance to use until university level, such as in our 'Forensics' workshop where they use micropipettes, restriction enzymes and gel electrophoresis equipment to determine who may have committed a fictional

crime. It's another perfect example of how we connect science with our everyday lives at the Ri, and for these older students that has the real-world benefit of opening their eyes to potential careers.

Our workshops have always been in high demand, with dates booking out at least six months in advance. It's particularly pleasing to see schools from all over the UK making the trip to the Ri, as well as international schools from Australia, Japan and Spain. Many schools return year after year and teachers say that a visit to us is a highlight for the students in their year.

So a personal highlight of mine is when the same students return, and you can see them developing their scientific confidence. That's because I believe my job is to empower every young person to learn the skills they need to reach their potential, while also providing them with a positive experience with science that they'll always remember fondly.



**Right:** Jemma with another of her young scientists of the future

**Next page:** A unique glimpse of the CHRISTMAS LECTURES Demo team at work







# Our finances

In 2021, along with so many other charities, we again experienced a dramatically changing operating environment as Covid restrictions continued to impact our delivery and income. Nevertheless, the Ri remains stable and we continue to see strong demand for our educational activities and our public programme. We have appointed new directors, re-launched programmes, grown new audiences, worked effectively remotely and incurred a deficit much lower than budgeted.

The pandemic has enabled us to re-examine what we do and how we do it, and to look to strengthen our collaboration with other organisations committed to science engagement. We are clear that building a portfolio of funding sources, both commercial and philanthropic, is essential to support future charitable activities for the benefit of the general public and to ensure sustainability.

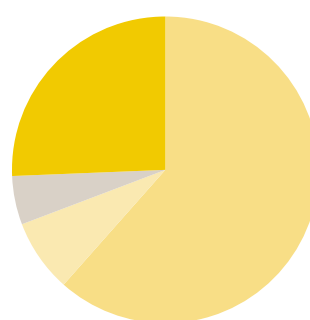
Our total income in the 2020-21 financial year was £3.2m. We generated £1.4m of trading income, £0.8m in voluntary income through membership and events, and £1.0m in voluntary income through fundraising. Due to the continued impact of Covid-19 we incurred a deficit of £32,000 on unrestricted funds compared to a deficit of £1,105,000 in 2019-20 and a £9,000 deficit the year before that.

The 2020-21 deficit was significantly reduced by the receipt of £530,000 from Arts Council England under the Cultural Recovery Fund and continued support from the UK Government's furlough scheme. Measures to reduce

operating costs that were implemented during and following the first lockdown have also shown effect during 2020/21.

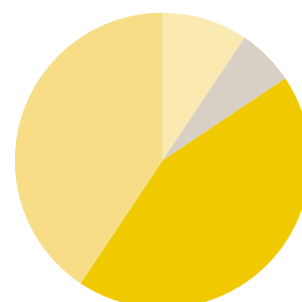
**'The pandemic has led us to re-examine what we do and how we do it.'**

Full audited accounts are available to download from the Ri and Charity Commission websites.



**Left: How we spend our money.**  
**Total expenditure 2020-21: £3.9m**  
 ● Education programme: £2.4m  
 ● CHRISTMAS LECTURES: £0.3m  
 ● Heritage: £0.2m  
 ● Trading: £1.0m

**Right: How we fund our work.**  
**Total income 2020-21: £3.2m**  
 ● Donations and legacies: £0.3m  
 ● Grants and events: £1.3m  
 ● Membership and subscriptions: £0.2m  
 ● Trading: £1.4m



# Our governance

The Royal Institution was founded in 1799 and received its Royal Charter on 13 January 1800. We are an independent Royal Charter charity, governed by our Byelaws and governing documents.

Our Trustees number 12 in total, nine elected by the membership of the Ri and three appointed by the Board. The Trustees ensure the Ri carries out its charitable purposes for public benefit and complies with its governing documents. Trustees have overall responsibility for managing the business of the Institution; setting strategic direction and objectives; safeguarding the Institution’s assets; overseeing all significant capital expenditure and relevant policies.

The Board meets a minimum of four times per year and is supported by four standing Committees; the Audit and Risk, Finance, Nominations, and Remuneration Committees.

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**Royal Patron –**  
HRH The Prince of Wales

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**President –**  
HRH The Duke of Kent

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**Honorary Vice President –**  
Sir John Ritblat

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**Trustees –**  
Sir Richard Sykes (Chair)  
Prof Alison Woollard (Vice Chair - elected April 2021)  
Sir Richard Catlow (appointed April 2021)  
Dr Sophie Forgan (elected April 2021)  
Simon Godwin  
Kate Hamilton (appointed April 2021)  
Sir Roland Jackson  
John Krumins  
Dr Suze Kundu  
Renato Lulia-Jacob  
Chris Potter (elected April 2021)  
Prof Angela Seddon

# Vital support for our charitable work

We have welcomed Members at the Ri for over 200 years. Helping to shape the Ri from its very earliest years, they hold an important place in our rich heritage, sitting at the heart of our charitable purpose of public engagement with science.

That remains true today and our Members continue to be of all ages, come from all walks of life, from across the UK and around the world. Now, as then, everyone can become a Member of the Royal Institution.

Motivations for joining may differ; for some it may be the discounted access to our public talks and Discourses, while for others it's the desire to contribute to the preservation of our heritage, or to help us create opportunities for more people to discover and critically examine science. Some continue their journey with us as a Member for life, while others choose to increase their engagement and support by becoming an Ri Patron.

What they have in common is that their support, financially and in kind, is vital to the present and the future of the Ri, and to the charitable work we do.

For the second year in succession, 2021 was as challenging for Ri Members and Patrons as it was for the Ri team

dedicated to meeting their needs. With our building being closed for much of the year due to the necessary Covid restrictions, and a limited number of in-person events for the remainder, there was little opportunity to offer the major benefit of discounted and free access to talks in our theatre.

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**'Their support, financially and in kind, is vital to the present and the future of the Ri, and to the charitable work we do.'**

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We were pleased to be able to offer exclusive access to the CHRISTMAS LECTURES filming again, and we worked hard to create other bespoke activities – including a popular Members quiz, an exclusive 'in conversation' event with Uta Frith and, for our Ri Young Members, a series of fun and engaging experiments to do at home. Yet there is no escaping the fact that our Members and Patrons' benefits were greatly reduced and we saw an understandable decline in Members of around 20%, further impacting the income we rely on for our charitable activities.

We would like to thank the majority who chose to remain as Members, or increased their level of patronage, or joined us for the first time. Their continued support has helped us navigate the most challenging time in our long history, and remains vital to securing the future of the Ri. Thanks to that support, post-pandemic, we can recover and grow.




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**Left:** A regular seat in a packed Ri Theatre; one of the joys of Ri Membership



# Thank you

We would like to extend a huge thank you to all those who generously support the charitable work of the Royal Institution. Our Trustees, Patrons, members, donors, corporate supporters, volunteers and visitors give us their time and expertise so freely, make an invaluable financial contribution, or both.

As an independent charity we rely on your support to encourage people of all ages to begin their lifelong journey with science. We look forward to continuing our important mission with you in 2022.



## Major supporters –

Arts Council England via the  
Culture Recovery Fund  
Bain Capital Children's Fund  
Europe  
Causeway Technologies  
The Clothworkers' Foundation

IBM  
Kantor Charitable Foundation  
Lloyd's Register Foundation  
L'Oréal UK & Ireland  
The Godwin Family

## Additional thanks –

We would also like to thank all those who have named a seat in our historic theatre through our 200 seats for 200 years campaign, with a special thank you to:

Azad Ayub  
The Faraday Foundation  
Renato Lulia-Jacob  
The Godwin Family

## Director's Circle Patrons –

Luca and Leila Bassi  
Cristóbal Conde  
Simon Godwin  
Hank Roberts

## Corporate partners –

AWE plc  
Bayer  
Environment Agency  
Faraday Institution

KPMG  
Reckitt Global Hygiene Institute  
UK Research and Innovation

## Faraday Circle Patrons –

The Faraday Foundation  
James Del Favero

Sir Desmond Pitcher  
W & M Seddon

## Diffusion Circle Patrons –

Nicholas and Tobe Aleksander  
Mike Altendorf  
Azad Ayub  
Stephen Corben  
Paul Drake  
Damon Patrick de Laszlo

George Maher  
Duncan and Lynn McInnes  
G J Moore  
Martin Pidd  
Michael Fasosin

## Trust & Foundations –

Company of Actuaries Charitable Trust  
AG Manly Charitable Trust  
AM McGreevy No. 5 Charitable Settlement  
The Bernard Gold Foundation  
Brian Mitchell Charitable Settlement

GM Morrison Charitable Trust  
Kusuma Trust UK  
LG Harris Trust  
The Rose Foundation

## Magnetic Circle Patrons –

Iain Bratchie  
John L Collins  
Florian Dommert  
Karen Hodson  
Jerry Horwood  
Chris Lowe  
Katharine Medlow  
Ralph Rayner  
E C Renton  
Sir John Ritblat

Dame Theresa Sackler  
Gavin and Georgina Sallery  
Sir Richard Sykes

All of our Electric Circle Patrons and all who wish to remain anonymous.

## Other partnerships –

The Association of Science  
Discovery Centres  
The Genetics Society  
The Grantham Institute for  
Climate Change

The London Institute of  
Mathematical Sciences  
The National Education Union  
STEM Learning  
Tackling pseudoscience, at the Ri  
UCL

**Above:** The CHRISTMAS LECTURES audience; just some of the thousands of children we engage with science thanks to the contribution of our supporters.

