



The Royal Institution
Science Lives Here

Year in review 2018





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On 1 October this year we launched a new and ambitious strategy for growth and impact. As we deliver our vision for a world where everyone is inspired to think more deeply about science and its place in our lives, over the next five years our plans will see the Royal Institution double in size in terms of staff and expenditure on charitable activities. As the Science Editor of the Financial Times put it, we are ‘beginning a new age of discovery’.

We are pleased to report that we are beginning this new chapter from a strong foundation of success, both financial – reporting a surplus for the third year in succession – and in terms of outcomes for our audiences. Throughout the year we have inspired even more people of all ages and backgrounds to discover, discuss and critically examine science.

We held more public events than ever before, throwing open the doors to our wonderful theatre for fascinating explorations into the way in which science shapes the world around us. We increased the scope of our popular Summer Schools, adding exciting new workshops to welcome even more young people to the Ri, to begin their lifelong journey with science.

Our L'Oréal Young Scientist Centre continues to operate at capacity, and our sold out Family Fun Days saw nearly 3000 people flock to the Ri to enjoy hands-on experiments together. We never tire of seeing such energy and enthusiasm for science as when our building is alive with children. Possibly they will be the ground-breaking researchers of the future; certainly they will be active citizens who have the confidence to think critically about science and question its place in our lives.

We also continued to extend our reach beyond our base at Albemarle Street. Through our national network of Masterclasses we ran 900 sessions for over 6000 students, an increase of more than 20% on 2017. Our professional science presenters performed 127 Science in Schools shows, over 30% more than the year before; we headlined at the Big Bang Fair, reaching 80,000 children and their parents at the showpiece event of British Science Week; and we again took the CHRISTMAS LECTURES abroad to Hong Kong, Singapore and Japan, increasing the number of shows. By the end of the year we had engaged with over 150,000 new subscribers to the Ri YouTube channel, and we anticipate reaching half a million subscribers in early 2019.

We simply could not have achieved all that we have done in 2018 without the contribution of our small team of dedicated staff, our Ri Members and Patrons, our volunteers, and our broad community who give us their time, their expertise and their financial support. Our thanks go to them all for what has been a remarkable year of success for the Royal Institution, and we look forward to continuing our mission together in 2019.

Dr Shaun Fitzgerald
Director

Sir Richard Sykes
Chairman





‘...in this year’s CHRISTMAS LECTURES, after assuming correctly that its young audience were capable of a thoughtful bioethical discussion, the music swelled, it seemed the human genome was singing, and for a precious moment we were in the realm of the sublime. MARVELLOUS!’

— Ri Member

CHRISTMAS LECTURES

At the Royal Institution, we have been engaging people with science for over 200 years. And nothing exemplifies the way in which we build on our heritage, to make our activities relevant today, better than the family tradition that is our annual CHRISTMAS LECTURES.

If Michael Faraday, who instigated the CHRISTMAS LECTURES in 1825, were to join us for filming in our theatre today, he wouldn’t take long to orientate himself in familiar surroundings. He would recognise the plethora of props and demos designed to inspire young minds; the passion and expertise of the Lecturer, a fellow scientist working at the cutting-edge of modern research; and the eager, excited young faces of our audience.

Yet the CHRISTMAS LECTURES today are different. No longer are they a body of knowledge

to be imparted and learnt, but rather the focus is on science as a process of continuous exploration. Year after year we have made the content more open-ended and relevant to our everyday lives, helping young people to consider how science should be used for the benefit of society, even as they learn and have fun.

And today the Lectures are so much more than a one-off event, increasingly becoming the centre piece around which we build a year-long national conversation about the impact of science on society. In 2018, we asked challenging questions about privacy. In the year ahead we will do the same around identity – encouraging children in schools across the UK to debate and consider the issues – and we will extend the 2018 CHRISTMAS LECTURES topic into our 2019 programme of public events.

‘Great to see the complexity of genetics being discussed and the ethical dilemmas that arise with our ever expanding knowledge. Hope this has inspired the next generation of geneticists.’

— Twitter feedback

‘Two wonderful role models for any young person (especially girls) interested in science. So many good lessons too about diversity. I shed a tear at the end.’

— Twitter feedback

‘It was a joy to watch with my family and for my children to take on board the lessons from the Lectures.’

— Twitter feedback



The 2018 CHRISTMAS LECTURES: 'Who am I?'

We are 99.9% the same as the next person, yet we are 100% unique. In the 2018 CHRISTMAS LECTURES, scientist, TV presenter and author Prof Alice Roberts explored the mix of evolution, genetics and environment that makes us who we are.

To cover such a broad subject and to celebrate the centenary in 2019 of the Genetics Society – one of our CHRISTMAS LECTURES supporters – Alice was joined by geneticist, Prof Aoife McLysaght, as a Special Guest Lecturer.

Together, Alice and Aoife took us on a 4 billion-year journey through our evolutionary past to answer the most fundamental of questions: Who am I?

From our hidden similarities to a fruit fly, to the story of the emergence and global spread of our own species, to the interplay between genes and environment in creating individual differences, Alice and Aoife uncovered our true place in the biological tree of life. And they asked challenging

ethical questions about what the future holds for our species.

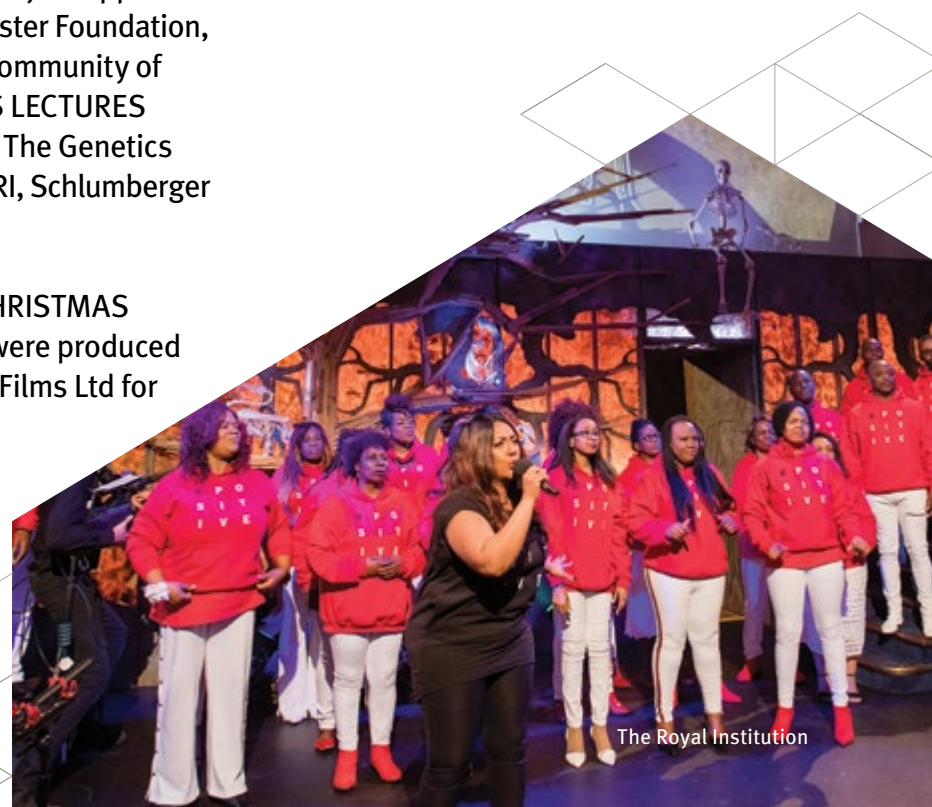
During filming, we were pleased to be able to increase the number of young people in the audience from under-represented groups, including through our partnership with the Foyer Foundation.

As ever, we must extend our thanks to 2018 CHRISTMAS LECTURES major supporter Lloyd's Register Foundation, and to our community of CHRISTMAS LECTURES supporters, The Genetics Society, UKRI, Schlumberger and BGI.

The 2018 CHRISTMAS LECTURES were produced by Windfall Films Ltd for BBC Four.

'Lloyd's Register Foundation is proud to be a major supporter of the CHRISTMAS LECTURES from the Royal Institution. Our aim is to stimulate young people's interest in science and engineering and encourage them to study it from an early age. We are committed to bringing skills and education to previously disadvantaged or under-represented groups and inspiring the next generation of scientists and engineers.'

— Dr Tim Slingsby, Director of Skills and Education at Lloyd's Register Foundation



The Royal Institution

A national conversation

The impact of the CHRISTMAS LECTURES doesn't end with the final broadcast. Instead the Lectures are the start of a year-long programme of activities to engage our audiences with an in-depth examination of each year's particular topic.

Certainly that national conversation starts on broadcast nights, with millions of people engaging on social media – commenting, questioning, and adding their own knowledge and opinions. In 2018 #xmaslectures was trending on twitter for the third year in a row, with one million impressions and 1200 retweets of Ri content. Overall the number of impressions on twitter was almost double that seen the previous year; while Instagram impressions also rose significantly.

In 2018 we then extended the life and reach of the 2017 CHRISTMAS LECTURES through our online Q&A with the Lecturer, Prof Sophie Scott, and other experts from academia and industry; and through our regular international tours, to Singapore, Japan and Hong Kong.

And for the first time, we worked with the team at 'I'm a Scientist Get Me Out of Here' to encourage a national debate in schools. Using a bespoke debate kit for busy teachers to begin using without the need for preparation, we asked children aged 10–14 to consider diverse viewpoints in debating one simple question: 'should our smartphones always be listening?'

It is an indicator of success that our debate kit was the most popular ever created by the 'I'm a Scientist' team. However, what matters more are the outcomes.

Not only did the debate kit get used by science teachers, but also by those teaching other subjects, involving pupils who don't ordinarily take an interest in science. And crucially, through greater understanding we

saw the young people's own viewpoints change as their debates progressed; representing perfectly the critical examination of science that we were seeking. It was confirmation of what we have always believed; that young people are more than capable of engaging in lively discussion about science, and of developing informed viewpoints on its application in our lives.



1 million

Twitter impressions during broadcast

Family learning

Support for science at home

Teachers tell us that parental encouragement of a child's burgeoning interest in science has an influence on the number of students taking up science subjects in the later stages of education. So our busy and varied Family Programme provides the perfect opportunity for parents to offer support for science outside the school environment.

From activities for adults and children together, to our evergreen ExpeRimental videos, to workshops for children to discover and explore with their peers, we give families exciting, stimulating and thought-provoking experiences to kick-start and nourish a lifelong interest in science.

Our Family Programme continued to grow in 2018, with well over 8600 people attending 126 events throughout the year. Our activities provided a diverse range of opportunities for families to join together and explore science in a hands-on, creative and inspirational way. From learning how movies make explosions in space look real, to making paintings with cabbage indicator,

we didn't stop trying new things to excite our audience.

Family theatre talks also continued to grow in popularity, with a wide range of talks on offer from popular mathematician and puzzle maker Rob Eastaway to 'Great British Bake Off' finalist Andrew Smyth, who used baking to explore the principles of engineering.

And as is fast becoming a tradition at the Ri, the fantastic and explosive Andrew Szydlo returned for a demo-filled extravaganza on the eve of Bonfire Night. Andrew's videos continue to be some of our most popular talks on YouTube, showcasing the Ri as the home of exciting science demonstrations.

'The incredibly accessible way that all the team explained science – hugely impressed by the young people leading as examples for children.'
— Family Fun Day parent

'My favourite bit was that the person running it didn't mind if you did it your own way.'
— Child, Family Programme attendee



8600

people attended
our popular
family events



The Royal Institution

A building buzzing with children... and their grown-ups

There's always something interesting going on at the Ri. Nowhere else are you likely to bump into someone blowing something up one moment, and showing off a 17th century wooden globe, newly discovered in our archive, the next. It's fun to work here, but it's never quite as much fun as when we throw open our doors to crowds of science-mad children.

This year, as they always do, thousands came to the annual extravaganza of learning that are the Ri Summer Schools. From mid-July to the end of August, children of all ages enjoyed innovative and interactive sessions run by expert speakers. Each workshop brought the real-world applications of engineering, maths and computer science to life. Meanwhile, their grown-ups found some rare time to marvel at the internationally significant scientific collection housed in our Museum, or just relax in our Café.

Our Summer Schools continued to expand, with the addition of 13 new workshops from partners such as McLaren, the British Interplanetary Society and science-songwriter Jonny

Berliner. And they continued to grow in popularity too, attracting over 2100 students, and maintaining a year-on-year increase.

Our sell-out Family Fun Days also continued with the themes of 'The language of life', 'Science fiction' and 'Everything changes'. Enjoying hands-on science together, families had the chance to have their emotions read by a computer, make a rocket engine with pasta and even try out original demonstrations built in the 1960s by Ri legend Bill Coates!

Our Family Programme would not be possible without the hard work and enthusiasm of our dedicated team of volunteers who help



'I am delighted my boys attended this year and we can't wait for next year's courses; I've already recommended it to several friends.'
— Summer Schools parent





‘We highly value the work that you do in schools; inspiring the youth is a difficult thing, and no one inspires better than the Ri. We might never see the results, because it takes 20 years and they’re far too remote, but I firmly believe that one of your audience members is going to grow up and cure cancer or the equivalent, and an ingredient in their journey will have been the Ri schools programme.’

—Teacher, Science in Schools

Schools

Captivating young minds

We believe that a lifelong journey with science means igniting interest at an early age and sustaining it throughout adulthood with repeat opportunities to engage. So with science competing with literacy and numeracy in the primary curriculum, challenging financial conditions in schools, and increasing pressures on teachers’ time, our educational outreach is more important than ever before.

We offer a balanced and holistic programme of activities, for children of all ages, supporting the curriculum inside and outside the classroom. From our Science in Schools shows designed to inspire younger age groups with fun, explosive demonstrations, to our Masterclasses offering a more in-depth exploration of maths, engineering and computer science, we are in the business of captivating young minds.

In 2018 we increased our support for schools across all programmes. We performed more Science in Schools shows, took more young people through our Masterclasses,

and added more workshops to our Summer Schools. Our L’Oréal Young Scientist Centre continued to be full to capacity, with many schools returning to enjoy hands-on science in the very place that spawned 15 Nobel Prizes, as they have done every year since the LYSC opened in 2009.

At the heart of our educational programme is engagement with schools in less advantaged communities, beginning with our STEM grant awards and continuing with free Science in Schools shows and tickets to the CHRISTMAS LECTURES, made possible by the generosity of our supporters.

In all we created more opportunities than ever before to explore the wonders of science and to think more deeply about its impact, for those who will be the scientists, business leaders, policymakers and citizens of tomorrow.



Over
100
STEM enrichment
grants awarded to
schools during
the year



L'Oréal Young Scientist Centre: Awesome trip, fun experience, nice science!

Every year thousands of schoolchildren descend on our L'Oréal Young Scientist Centre (LYSC) to enjoy scientific exploration in support of the school curriculum. Feedback from students and teachers alike tells us it's a special experience.

The younger children explore the basics of cosmetic chemistry or extract their own DNA, and tell us they want to be scientists. The older children delve more deeply into genetics and electromagnetism, and tell us it's helped them prepare for their exams.

A visit to the Ri represents an opportunity to break free from the classroom and get to grips with the scientific process through fun, entertainment and education.

In 2018 we welcomed 144 schools during term time and ran 35 holiday workshops. The majority of attendees are from state schools, with 59% identified as from the BAME community, while the proportion of home-schooled groups rose to 23%, up from 14% in 2017.

In all we reached 4500 students, all benefitting, whatever their background, from an in-depth experience at the LYSC.

And we continued to extend the reach of LYSC activities beyond the basement at 21 Albemarle Street, and to develop bespoke sessions for larger groups. Our 'Cosmetic chemistry' workshop has run at all three Butlin's Holiday Camps, with an estimated 20,000 children taking part. We have continued to work with the University of Central Lancashire in developing LYSC activities, while cementing a similarly impactful partnership with Bayer at their Baylab in Reading.

As we celebrate the 10th anniversary of our partnership with L'Oréal, during which time we have interacted with over 116,000 young people, we look forward to continuing this long-lasting legacy.

'For the forensics workshops, the level was ideal to challenge beyond GCSE, yet keep some mystery and information for A Level study, and the way you explained the work to the girls was just right for them.'

— Teacher, LYSC

'This workshop made me very interested in studying science in the future and it reminded me of how many great things women can do.'

— 11-year old YSC pupil

'When I get older I am going to send my children here.'

— 9-year old LYSC pupil



179

events for 4500
students
during 2018



2019

when we will
welcome our
100,000th
student

Masterclasses

For nearly 40 years our national programme of Masterclasses has been highlighting the beauty and relevance of STEM subjects to eager students, providing an in-depth exploration of mathematics, engineering and computer science. From Truro to Aberdeen, the enthusiasm of our diverse network of volunteers opens students' eyes to the power of these important disciplines and we are grateful for their support.

This year we delivered 900 Masterclass sessions for over 6200 school students, a 22% increase on last year. We also reached a further 2900 students through a variety of additional events, including celebration days, Masterclass alumni meetings, and literary and science festivals.

We developed eight 'off-the-shelf' Masterclasses resource sets, available to download for free from our website. With subjects including magic squares, Möbius bands and digital computers, they represent a fantastic tool for Masterclass groups or any teacher wanting to deliver high quality, ready-made maths enrichment workshops to primary school pupils.

And we also introduced a new volunteer recruitment process, including formal training for those wishing to become a Masterclasses presenter, adding 30 new presenters to our existing network of experts as a result.

In the year ahead we will pilot a new series for engineering and computer science at primary level, while continuing to grow our network with a particular focus on primary education. A planned collaboration with the National Centre for Nuclear Robotics will allow us to bring new robotics activities into the Masterclasses.

At the same time, we look forward to welcoming our 100,000th Masterclasses Student in early 2019.

'We were proud to initiate and fund the launch and long-term development of the Royal Institution Computer Science Masterclass programme – helping to find, engage and inspire the next generation of computer scientists. Five years on we continue to support the Ri as the programme goes from strength to strength.'

— Phil Brown, Chairman and Chief Executive Officer, Causeway Technologies

'We are very appreciative that you make these opportunities available to local children – it is incredibly valuable and really does make a difference.'

— Parent, Masterclasses

'The Masterclasses have broadened my sons' thinking as well as allowing them to expand and express themselves confidently in the beautiful world of mathematics.'

— Parent, Masterclasses

Masterclasses case study: Empowering the presenters of the future

The increase in the number of Ri Masterclasses we have been able to run this year is due in no small part to an innovative approach we began to roll out in late 2017, with sessions led by sixth-form pupils, trained by the Ri.

The students benefit from the perspective of their presenters who are just a few years older than themselves; while the sixth-form pupils gain confidence and new skills, imparting their passion for science to those who are eager to learn. At the Ri, we benefit from knowing that we are able to reach many more students as a result.

Director of STEM at Chipping Campden School and National Teaching and Learning Lead at The Ogden Trust, Jackie Flaherty, explains why using this innovative approach, first trialled at her school, was such a runaway success:

‘Our Masterclass series ran weekly with primary pupils from seven local schools attending sessions run by Year 12 student ambassadors studying maths and physics. The topics covered included Pythagoras, Fibonacci

sequences and a Hooke’s Law challenge.

‘It was wonderful to see the older students deliver exciting and challenging lessons for the talented primary mathematicians. The sixth-form students are already planning follow-up activities as they enjoyed it so much.

‘Our aim, and the reason why we were so keen to trial this approach with the support of the Ri Masterclasses team, is to help students to deeply explore a range of ideas and applications in a given scientific discipline and to inspire them to continue their engagement in these areas.

‘Feedback from the primary pupils and their parents has been 100 per cent positive, and we have already extended the scheme to include four other secondary schools in our area!’

‘The return on investment is seeing young people genuinely engaging with, lighting up and enjoying a Saturday morning of maths. I’ve had the delight of being asked such insightful, probing questions I’ve had to have my brain working overtime to give a good enough answer.’

— **Presenter, Masterclasses**

900
Masterclasses
in 2018 for 6200
students



The Royal Institution

Science in Schools

Our professional Science in Schools presenters tell us that when they enter a school hall packed with 7–11 year olds, the sense of anticipation is palpable. For the children, it’s a collective experience and a chance to enjoy a fun and explosive introduction to the power of science. It’s a break from the normal routine; it’s not every day they see the man or woman ‘from the Ri’ blow things up in the school hall.

This year we increased the number of Science in Schools shows we performed by 32%, engaging nearly 45,000 children, and their parents, in 130 schools. In doing so our dedicated presenters have travelled from Peckham to North Yorkshire and from Liverpool to Essex. And thanks to support from The Shears Foundation, The John S Cohen Foundation and Essex County Council we’ve been able to reach 25 schools in disadvantaged communities, giving their children the opportunity to experience our particular brand of explosive science for free. In 2019 we are planning to increase this number threefold, delivering 77 free Science in Schools shows.

Increasingly we are adapting our shows for use outside the school environment. Throughout the year, we returned to many science festivals across the country and were also invited, for the first time, to the Curious Arts Festival in Hampshire. In September, we delivered a week-long programme of events at the Singapore Science Festival, supported by Lloyd’s Register Foundation, and made possible thanks to a long-standing relationship developed through taking the CHRISTMAS LECTURES on tour every year.

Through Science in Schools our impact in the UK, and our international reputation, continue to grow.

45,000

children reached by our shows, through 30% more shows than in 2017

‘I bet you inspired at least a few kids in the audience to pursue a career in science.’
— **Pupil, Science in Schools**

‘The children loved every single minute of the show and have been talking non-stop about their favourite parts and experiments they loved! The parents who attended the evening show could not have wanted for a better way to engage their children into science!’
— **Teacher, Science in Schools**



Public events

Sustaining a lifelong journey with science

Our theatre has always been the place where the latest research and scientific advances have been shared with the world. The first electric motor, discovery of the electron, photography, the principles of climate change, to name but a few; all have been revealed for the first time, to an audience at the Ri.

Today, evening by evening and talk by talk, we are building on that tradition.

This year, the 2018 Brain Prize winners unveiled their subsequent research that could slow the onset of Alzheimer's Disease, Ijeoma Uchegbu unveiled the findings that could provide a solution to the opioid crisis, and Adrian Thomas demonstrated his world-leading development of a new generation of drones.

So every time a speaker walks into our packed theatre, our audience knows that they just might be about to see the new advance that will shape our future world, just as those who listened two centuries ago to Faraday, or latterly to Curie or to Marconi.

Our audience is increasingly diverse as we continue to broaden the spectrum of science-related topics we cover. Some come to the Ri for hard science, others for culture, and still more for new experiences. Some work in science, most have an interest in science, but for many neither applies.

What they do have in common is a desire for knowledge, mental stimulation, enjoyment and a cultural night out with a difference. When asked, the near unanimous verdict from attendees at our public events is that they have enjoyed the evening and learned something new. That enjoyment and learning is just one of the ways in which we are sustaining an individual's lifelong journey with science.

Ask an attendee at our 'Valentine's Day vaginas' talk in February, if they had ever been to a science lecture before and they'd probably say no. Feedback tells us the answer would be very different, if the question were to be 'will you come again?'



2018 Events

Throughout 2018 we welcomed audiences to 99 adult events at the Royal Institution, a 10% increase on the year before, and more than at any time since we closed for refurbishment a decade ago.

Our nine Discourses – part of the longest running series of scientific lectures in the world – were given by world-leading thinkers such as the discoverer of Ebola, Peter Piot, TV mathematics star Hannah Fry and Ri Director Shaun Fitzgerald. At other public events, Jeremy Baumberg and Katrina van Grouw asked us challenging questions about the impact of globalism on science and the ethics of 'unnatural selection' respectively.

We continued to innovate, hosting our first ever 'Murder MysteRi' event, where attendees turned detective to solve a fictional crime committed in 1839. We also celebrated 10 years of our science book club 'Fiction Lab', and launched a host of popular science books, including the latest by Italian physics superstar Carlo Rovelli, on the physics and philosophy of time.

Partnerships were a strong theme again, including those with like-minded organisations such as analytics firm QuantumBlack, with whom we continued the series of events under the 'Operating at the boundaries' banner. And we again hosted the Genetics Society's prestigious Haldane Lecture, given by Turi King, who provided the genetic evidence that the bones found in a Leicester car park were indeed those of Richard III.

In the year ahead, we look forward to bringing more of the brightest and best speakers to share their work with the world, at the Ri. We look forward to more themed series, providing exploration at a greater depth, and to continuing to ask the societal impact questions to which we should all be seeking answers.

'This was a brilliant example that the Ri is a brilliant and safe place to venture into topics no one else dares to!'
— Public event attendee

'The quantum computing lecture respected the intelligence of the audience and stretched us a bit. It was good to be reminded that scientists are very aware of the social impact of their work.'
— Public event attendee



Our feedback

Our activities are fun, engaging, thought-provoking and often explosive. Yet it is the impact they have on people's lives that matters most. Our feedback tells us we're making a difference.

'I want you to see what a difference you are making. Until my son had seen you his grades were less than efforts. Once seeing you, he lit a torch in his mind.'
— Public event attendee

'I love this trip, best trip ever! This was made for me, I love science.'
— LYSC Pupil

'Students have still been stopping me today and telling me what a fantastic time they had and that they didn't realise how science could be so amazing.'
— Teacher, Science in Schools

'I explained to her how many amazing lectures and presentations had been given in your theatre and said, 'One day you could be standing here and telling us all about your discovery' and she said 'Yes Grandad that would be wonderful.' I think those few words truly state what amazing work the Ri does at all levels to promote science.'
— Grandparent

'The children were treated like they were intelligent beings who had a lot to offer and who could teach us adults a thing or two too.'
— Parent, Masterclasses

'I can't tell you how much difference it makes to aspiration levels when pupils can see their communities represented. As I am always saying: 'If you can't see it you can't be it.'
— Teacher

'I took my teenage daughter to the 'Future pharma' talk last night and was so pleasantly surprised to see four of the five panellists were women. It was inspiring to be able to show her what women in the STEM fields can do.'
— Public event attendee

'On arrival at a school Masterclass yesterday, one 10-year old bounces up to his friend and says 'I've been awake since 4.30 this morning, waiting for this to start!'
— Organiser, Masterclasses

'Years of attending lectures at the Ri has inspired me to go back and study.'
— Ri Member

'Thanks for running these events, they are really excellent, and my children always come away from them really excited about being scientists!'
— Parent, Family Fun Day



Heritage

A foundation for the future

Building on our rich heritage at the Royal Institution, using it to bring to life the development and modern-day application of scientific research and communication, is central to our mission.

Through our museum and our archive we are guardians of an internationally significant collection of scientific apparatus, archives, books, artefacts and images. Uniquely, all are associated with the eminent natural philosophers and scientists who researched, lectured and lived in the Ri building. Our past represents a foundation for our exciting future.

As such it is important that we not only care for our collection, but also continue to undertake research into our history and impact.

The assessment of the conditions of the archival collections, funded by the Charles Hayward Trust, has continued throughout the year. Our conservator, Zofia Wyszomirska-Noga, has assessed a number of significant aspects of the collection for further

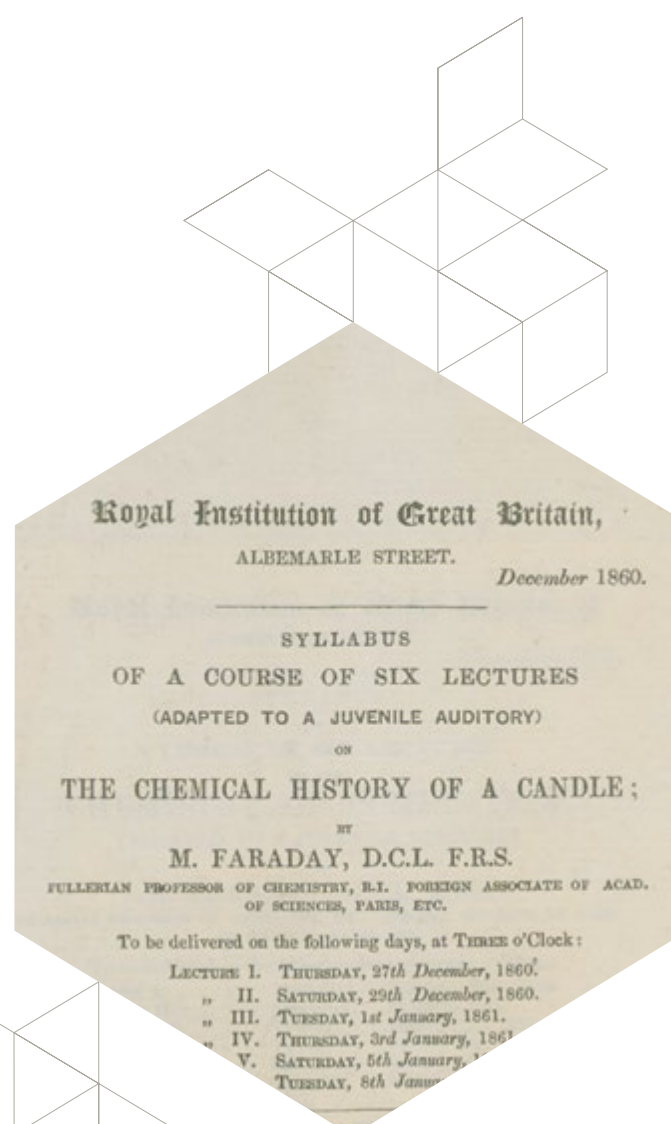
conservation, including the original transatlantic telegraph message tape from 1858 and a rare Selenograph by John Russell from 1798.

We are seeking further support for this important conservation work in the year ahead.

Thanks to the Philip Freer Trust we receive funding to support PhD students, and in 2018 two students successfully completed their theses on various aspects of the Royal Institution's history. Dr Rupert Cole examined the role of the Two Cultures debate in structuring the development of the Royal Institution from the 1940s to the 1980s, while Dr Harriet Lloyd demonstrated the key role that women played at the Royal Institution during its first decade.

'The Ri's collection is out of this world.'
— Museum visitor

'Such an excellent evening at the Ri, and for the chance to visit the archive in the afternoon. The archive was fascinating.'
— Ri Trustee guest



Sharing our collection with the world

Spread throughout the three publicly accessible floors of the Ri building, our nationally accredited Faraday Museum is open to everyone, for free. The fantastic cultural resource it houses, supplemented by our wider archive, is used to share both fascinating artefacts of history and insights into the relationship between science and the public. It is important that our heritage, and our expertise, is shared with the world.

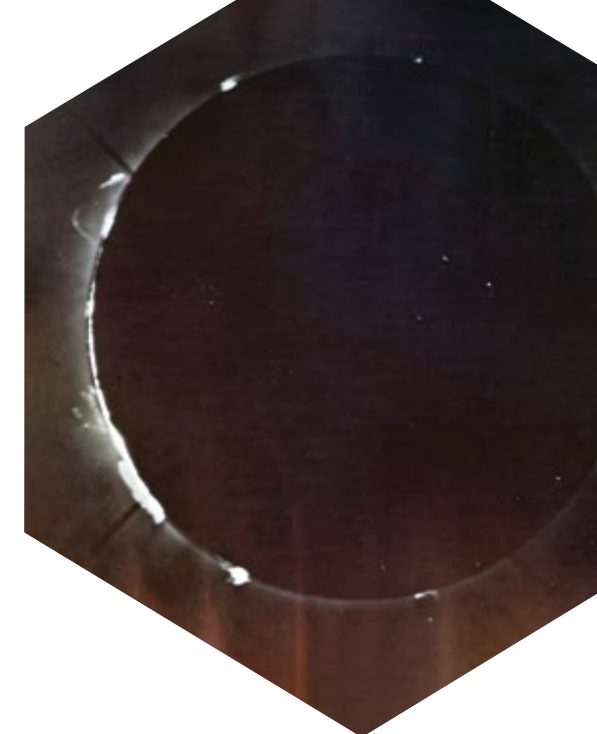
In 2018 we welcomed over 70,000 visitors, hosted over 70 archive visits and provided hundreds of people with detailed tours highlighting our history and heritage.

Our Heritage and Collections team provided expert advice to a number of film, radio and scientific organisations that highlighted elements of the Ri's history and collections, ranging from a number of items from the Bragg collections to batteries from Faraday's collection. Also during the year we filmed a BBC Four documentary on 'Magnets and magnetism' with Hannah Fry and a programme on electrical innovation that was subsequently released in a number of theatres nationwide.

Many of our artefacts reached a wider audience through loans to other museums and institutions; the only time, save for archival storage and conservation, that they leave our building, the place where they were discovered or created.

Faraday's notebook of the lectures by Humphry Davy that he attended was loaned to St Catherine's College, Cambridge; while we also worked with the Dickens Museum on their four-month exhibition on 'Charles Dickens: Man of Science', lending a facsimile of Faraday's, 'Chemical history of a candle,' Christmas Lecture notes and a Faraday candle stick.

And in September we contributed to the Science Museum's major exhibition, 'The Sun: Living with our star', through the loan of an original glass plate negative depicting the first ever photographic image of an eclipse of the Sun taken by Warren De La Rue in 1860. We were delighted that this loan not only brought elements of our collection to a new, larger audience, but also reunited De La Rue's original images with his photographic equipment for the first time in well over a century.



Digital

Digital engagement: Taking our content to our audiences

If we are to be successful in our mission to create opportunities for everyone to discover, discuss and critically examine science, we recognise that we cannot rely on the activities we run in the Ri building alone.

Our digital platforms give us the power to take our brand of stimulating and engaging content to wherever our audiences are. At the swipe of a smartphone screen anyone can engage with science through the Ri, anywhere in the world. Crucially, they can do so whenever it suits them best.

We have thought carefully about the sort of content each of our audiences wants, and as we continue to put digital activity at the heart of our engagement, we are reaching more people than ever before. Many of them could never, or maybe would never, visit our historic home in Mayfair.

In 2018 our small digital team released 133 videos, including Ri talks, CHRISTMAS LECTURES archive videos and short films produced in-house.

Our animator-in-residence has been preparing a new animation for release in early 2019. And in May we launched our Patreon channel, a platform designed for creators to build communities and generate crowdsourced revenue, helping to increase people's awareness of, and participation in, the work of the Ri.

In October, as one of our activities to mark Black History Month, a 'takeover' of the Ri twitter feed by scientist and advocate Alex Lathbridge (AKA @Thermoflynnamics) was described by one of our peer organisations as 'a thing of beauty'. We plan to run more events like this to increase the diversity of voices from our own social media, providing a platform for scientists to engage with the public.

0.5 million
YouTube subscribers
48 million
video views in total

International YouTube reach: (Top 10 countries)

Country	Views	%
USA	5,641,213	33%
UK	1,870,871	11%
Canada	872,160	5.2%
India	838,082	5%
Australia	616,028	3.7%
Germany	511,659	3%
Russia	385,685	2.3%
Netherlands	316,422	1.9%
Sweden	250,384	1.5%
Brazil	208,384	1.5%

YouTube

The popularity of the Ri YouTube channel was a standout success in 2018. Our most popular video – Harry Cliff's 'Beyond the Higgs: What next for the LHC?' – was viewed nearly 1 million times, while a further four videos received half a million views or more. In all, our videos were viewed 17 million times, taking total views since we first launched the channel to 48 million, with a total watch time of nearly 600 million hours.

Our passionate YouTube community continued to grow exponentially. In 2017 we welcomed 80,000 subscribers to our channel; in 2018 a further 150,000 joined us for the first time. We anticipate hitting half a million subscribers in early 2019, further strengthening our position as the largest YouTube channel of any UK museum or science organisation that we know of.

Yet while it was a record-breaking year, the statistics alone are not a satisfactory indicator of success. What counts is the level of engagement and the quality of experience our digital community enjoys. We know that repeat engagement is

more effective in developing a lifelong journey with science than a one-off event, however inspirational. So it is pleasing that on average a subscriber to the Ri YouTube channel will have viewed Ri content 100 times. The feedback we receive continues to point to a depth of exploration, inspirational content, and trusted voices as the key ingredients in our success.

We have received encouraging feedback and support from YouTube itself and in 2019 we look forward to further developing our innovative and much-loved channel.



Our subscribers' feedback:

'It is good to know that there are some YouTube channels that you can trust.'

'My daughter is home schooled and will be watching this, there aren't enough women in science and this simple explanation of a complex subject is something we need far more of.'

'Just about to apply to a master's programme in population ecology, focusing on endangered species. This video really inspired me to find the inner spark again, writing the best possible application letter I could write.'



CHRISTMAS LECTURES archive

The archive of televised CHRISTMAS LECTURES has been described by Sir David Attenborough and other past Christmas Lecturers as ‘national treasures from a golden age of broadcasting.’ They were the first science programme broadcast on UK national television, in 1936, and have been broadcast every year since 1966.

Until this year only around half of the CHRISTMAS LECTURES recorded by the BBC had been available for repeat viewing, but following a release plan drawn up with the BBC, in May we began to make them available on the Ri website, for new generations to enjoy.

In 2018 we uploaded 8 complete series; a total of 45 episodes. Over the next 12 months we will add a further 12 series, representing the entire available back catalogue of BBC recordings. The series range from 1968 to 1999 and include highlights such as ‘Gullivers law’ by Phillip Morrison, ‘The natural history of a sunbeam’ by Sir George Porter and ‘The magical maze’ by Ian Stewart.

And to complete the collection, in November we launched a national campaign to locate 31 episodes that are missing from the BBC archive, including rare footage of Sir David Attenborough that hasn’t been seen since it was first broadcast live nearly 50 years ago.

The feedback we have received from those who are watching these ‘national treasures’ – some for a nostalgic repeat viewing, many for the first time – testifies to their enduring appeal. By making past episodes available online – a first step in our plans to digitise our heritage and create a permanent digital legacy – it is possible to use the past to help inspire the scientists of the future.

‘The CHRISTMAS LECTURES have an iconic place at the heart of public engagement with science in the UK, so it’s wonderful that these rich sources of inspiration and wonder will be available again for new generations.’
— Ian Blatchford, Director of the Science Museum Group



Case study: Content tailored for our audiences

Meeting the needs of our audiences is central to our success at the Ri; Head of Digital, Cassie Williams, explains the work we have done to tailor our digital content:

‘Last year we released our five-year strategy which included the outcomes of a detailed audience segmentation, identifying four core audience groups which are key for us to fulfil our charitable mission.’

‘Two of these groups are engaged with science and already form a core part of our audience: Pioneers – science enthusiasts, and Connectors – omnivorous cultural enthusiasts. The two other groups are much less likely to interact with us physically, but are nonetheless key to our success: Seekers – interested in science and active online; and Followers – less likely to engage with science, but enthusiastic about pure science.’

‘Once we had identified these groups, our next challenge was to discover whether we already produce digital content they may want to consume. Armed with tea, biscuits and lots of post-it notes, we set to work layering our new audience plan onto our current digital output as we mapped our activities against these four key audience groups.’

‘What we found was that we’re mostly already on the right track. For our Pioneers, we release our hour-long Ri talks on YouTube. For our Connectors, we have animations exploring the intersection of science, culture and philosophy, while our shorter YouTube videos are aimed at our Seekers.’

‘We still need to do more to engage Followers, and we’re now experimenting with short, playful video formats ideal for social media sharing. We’re also redoubling our efforts on Instagram, to help reach Connectors and Followers. And finally we’re working hard behind the scenes to be in a position to release weekly Ri talks on our YouTube channel in 2019.’

Our community of supporters

Our members: The treasure of Ri Membership

For over 200 years, Royal Institution members have sat at the heart of our work to engage people with science.

Ri Membership is open to people of all ages and backgrounds and today, our community is growing. When someone joins as an Ri Member, they tend to stay with us; our youngest member is just three years old, our oldest is 97.

The enthusiasm and commitment of our community of like-minded people play a significant role in achieving our vision for a world where everyone is inspired to think more deeply about science and its place in our lives. The financial contribution from our members helps us to deliver our activities for young people in the UK and beyond, while their judgement is called upon when electing Trustees or voting on matters that are fundamental to the structure and operation of the Ri.

In return members enjoy free and discounted tickets for our events, priority booking, exclusive access to the CHRISTMAS LECTURES ticket ballot, and special offers from like-minded organisations including the Science Museum and the BFI.

Throughout 2018, we ran more exciting events for our members. In June we hosted our second interactive ExpeRience event, with our members and their guests enjoying hands-on astronaut training, experiencing g-force and taking part in a simulation of Tim Peake's Soyuz docking station courtesy of the British Interplanetary Society.

And building on the popularity of last year's closer look at the Ri's heritage, in March we ran a second workshop for Ri Members, helping them to preserve their most treasured family documents, under the expert guidance of our Heritage team.

In 2019 we will be conducting our bi-annual members' survey, giving our members greater opportunity to help us create and structure a programme that is tailor-made to meet their needs. We look forward to welcoming all of our members – young, old, new and returning – to continue their lifelong journey with science at the Ri.

Our members' feedback:

'Anyone who is interested in science and science issues should join for the opportunity to indulge!'

'There is something special about the Ri.'

'I think the Royal Institution is an amazing resource for anyone deeply interested in the sciences. It caters for all ages and is welcoming and easily accessible.'



Ri Patrons: A deeper connection with science

Our growing community of Patrons enjoy a deeper connection with science, and the Ri. Their support helps us to extend our reach, taking opportunities to engage with our activities to more and more people every year.

In 2018, we launched our new Director's Circle of patronage, while delivering the first full year of our new 'Ri Patrons present...' event series. In doing so, we opened our Patron programme to a general audience, while giving our Patrons special access to high-profile thinkers, such as Chief Scientist of Scotland, Sheila Rowan, and author and broadcaster, Evan Davis. We are grateful to them all for their continued in-depth involvement in our work.

Chris Lowe, a Ri Patron since 2016, told us what patronage means to him:

'As a member or Patron of the Royal Institution, you get to see and hear some of the world's leading scientists talk in-depth about their branch of science. As a Patron you also get to meet those scientists, which is an enormous privilege.'

'At the other end of the spectrum, one of the glorious things about attending lectures, events and Discourses at the Royal Institution is that you are sometimes privileged to hear a child speak of their experience. Following the first of the 2018 CHRISTMAS LECTURES, I heard a mother ask her son if he enjoyed the lecture and what would he score it on a scale of 1 to 10. The child of approximately 12 years of age responded immediately with an excited '11!'

'Like so many before him, both boys and girls, who have been motivated by Ri lectures in the past, he may become a scientist in the future. Hearing that short conversation is a joy that you simply cannot buy, although as a patron you can make a contribution.'



Trusts and foundations, and corporate supporters

Just like Ri Members and Patrons, our supporters hail from a variety of backgrounds, representing the diversity of our audiences. Some are individuals, others are long-established charitable trusts, and still more are major corporate organisations aligned with our aims.

What they have in common is that they all recognise our work to inspire everyone through science, as an objective worth investing in, both financially and in kind.

We are grateful to them all for their continued generosity and advocacy. Without their support we simply could not undertake such a wide range of activities, for so many people from so many walks of life.

In 2018, we were delighted to continue our significant partnerships with Lloyd's Register Foundation, L'Oréal UK and Ireland, the Clothworkers' Foundation and The Causeway Foundation, all helping to deliver our ambitious five-year strategy.

Examples of the support we received include a donation from the L G Harris Trust, which will enable an extra 40 schools in deprived areas across the UK to receive a grant towards exciting and innovative maths teaching activities; and the Reece Foundation continued their support of our engineering Masterclasses in the North East with a new three-year commitment of funding.

EY was again the principal supporter of our unconference for young people, which was also supported by the Ri's major supporter of the CHRISTMAS LECTURES, Lloyd's Register Foundation.

We look forward to working with all our supporters in the year ahead, as we continue to take our rich programme of science to as wide and diverse an audience as possible.

'There is a great need in this country to inspire more budding mathematicians and scientists. We are proud to be associated with the Ri who do so much to enthuse children from all backgrounds in this regard.'

— Alan Smith, Chair of the Worshipful Company of Actuaries Charitable Trust

Thank you

We must extend a huge thank you to all those who support the Royal Institution, in so many ways; our Trustees, Patrons, members, donors, corporate supporters, volunteers and visitors. 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 2019.

Major supporters

Causeway Technologies
Lloyd's Register Foundation
L'Oréal UK & Ireland
The Clothworkers' Foundation

Trusts and foundations

Company of Actuaries Charitable Trust
John S Cohen Foundation
The Doris Pacey & Dr Michael and Anna Brynberg Charitable Foundations
ERA Foundation
LG Harris Trust
Charles Hayward Foundation
AG Manly Charitable Trust
Brian Mitchell Charitable Settlement
GM Morrison Charitable Trust
Reece Foundation
Sfumato Foundation
Shears Foundation
DS Smith Charitable Foundation
Sonardyne Foundation

Corporate supporters

6point6 Technology Services
AWE plc
Bayer
BGI
Ernst & Young LLP
Newtecnic
QuantumBlack
Schlumberger

Other partnerships

British Psychological Society
The Faraday Institution
Genetics Society
Science and Technology Facilities Council
UK Research and Innovation

Ri Patrons

Director's Circle

Luca and Leila Bassi
Michael Fasosin
Ron and Helen Freeman
Simon Godwin
Bernard and Sarah Taylor

Faraday Circle

Cristóbal Conde
The Faraday Foundation
Fiona Forbes and Jonathan Hiscock
Hugh Harper
Sir Desmond Pitcher
Hank Roberts

Diffusion Circle

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Damon de Laszlo
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Nicholas and Tobe Aleksander

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Jaleh Namazi
Ian Laming
Chris Lowe
Martin Pidd
Geoff Potter
Ralph Rayner
Elizabeth Renton
Gurjit Samra
Sir Richard Sykes

All our Electric Circle patrons and those who wish to remain anonymous.

Venue hire

A unique and inspirational venue in the heart of Mayfair, the Georgian splendour of rooms at the Ri is available for exclusive events for 40 to 400 people. Those who enjoy our historic building are part of our community of supporters, with their financial contribution helping to fund our charitable outreach.

Increasingly we are welcoming organisations that are aligned with our aims; the Institute of Physics, the East London Science School, the Charity Commission and the Medical Research Council to name but a few. Many of them return to hold their events at the Ri year after year. As we seek to expand the use of space at the Royal Institution, it is fitting that so many of our venue hire clients share our ethos of public engagement with science.

In 2018 we hosted 315 events, welcoming over 33,000 visitors. Certsure hosted a unique technical conference on the 18th Edition of IET wiring regulations from our theatre and streamed the event live via satellite to 6000 professional electricians in over 40 cinema screens

across the UK and the Republic of Ireland. The Centre for Entrepreneurs explored how Britain, Europe and the world can create the next generation of entrepreneurs, while we were pleased to host the British Science Association's annual Huxley Summit for the second year in a row, linking science, business and policymakers.

Post-event feedback tells us that all who used the Ri enjoyed exemplary service, fine cuisine and state-of-the-art audio-visual support. And the experience is wrapped by our heritage; nowhere else in the world could you present your latest technology or scientific findings in the same theatre as Faraday unveiled the electric generator, or Marconi demonstrated his wireless technology.

95%

of our clients say they would use our venue again

'Thank you so much for all of your hard work making our event last week such a great success. The guests enjoyed themselves immensely and I had one very happy Chairman – so for me a complete success.'

— **Becky Smith,**
Medical Research Council

'We had such an amazing day yesterday and it was another brilliant RideLondon event for us at the Ri. Our riders had an amazing time and we had so many comments about how lovely the venue was so thank you for having us back again!'

— **Megan Gullam,**
Anthony Nolan

'Just to say thank you for helping us put on such an inspiring IoP outreach event at the Ri on Tuesday. It went really well and was enjoyed by all. Look forward to working with you all again in the future!'

— **Dr Mark Telling,**
Institute of Physics

Science abroad

Throughout 2018, we continued our programme of international collaboration, taking Ri content around the world.

In August and September we took the 2017 CHRISTMAS LECTURES on tour – to Singapore and Japan – for a mix of broadcasts on national television networks combined with live stage shows. For the first time, we added Hong Kong to the international tour, performing four shows at the Kellett School, the British International School in Hong Kong. Of the 150,000 subscribers we added to our YouTube channel, over 80% live outside the UK.

Our members hail from all over the world, including Qatar, Canada, Indonesia and Switzerland, and we continued to welcome international schools to our L'Oréal Young Scientist Centre, with 6% of all schools attending having travelled from such far away places as Australia and Japan. We also continued to partner with international embassies here in the UK, to run public talks in our theatre and exclusive events in their embassies, while our conservator's work was highlighted at the International Conservator's Conference held in the Warsaw Rising Museum.

And our Director of Science and Education, Prof Gail Cardew, heavily involved in the EuroScience Open Forum, the largest interdisciplinary science meeting in Europe since its inception nearly a decade ago, was appointed as Vice President of the Forum's founding body, EuroScience.

In the year ahead we will build on our existing international networks, reaching out beyond our historic home in London, to make Ri expertise and content truly global.



The Royal Institution

Annual review 2018



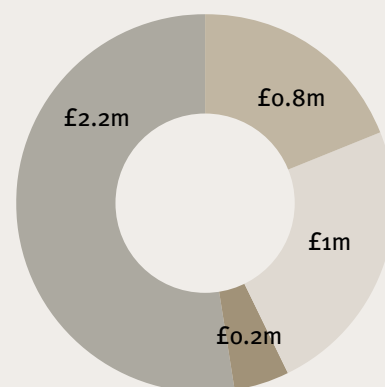
Our finances

For the third year in a row, we are pleased to report that the Ri posted a surplus in the 2017–18 financial year. In doing so we have maintained our strengthened financial position, while the appointment of a Director of Development, in December 2018, will enhance our fundraising capabilities.

In 2017–2018 we generated £2.2m of trading income, £1.2m in voluntary income through membership and events, and £0.8m in voluntary income through fundraising. We have achieved a surplus of £0.1m on unrestricted funds compared to a £0.28m surplus in 2016–2017 and £0.12m the year before that.

Our cash reserves remain robust with £1.14m as at 31 December 2018.

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



How we fund our work
Total income 2017–18: £4.2m



How we spend our money
Total expenditure 2017–18: £4.6m



Our governance

The Royal Institution was founded in 1799 and received its Royal Charter on 13 January 1800. It is an independent Royal Charter Charity and is governed by its Byelaws and governing documents.

The Trustees number 11 in total, nine elected by the membership of the Ri and two 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 maintaining relevant policies. The Board meets a minimum of four times a year and is supported by the Audit Committee, Finance Committee and Nominations Committee.

Royal Patron

HRH The Prince of Wales

President

HRH The Duke of Kent

Honorary Vice President

Sir John Ritblat

Trustees

Sir Richard Sykes
Chair

Dr Fergus Boyd

Dr Sophie Forgan
(elected April 2018)

Simon Godwin

Prof Yike Guo
(co-opted June 2018)

Hugh Harper
(retired April 2018)

Lord Julian Hunt

John Krumins

Sarika Patel

Geoff Potter
(retired April 2018; appointed April 2018)

Louise Terry
Deputy Chair

Prof Chris Toumazou
(retired May 2018)

Lord Robert Winston
(retired April 2018)

Prof Alison Woollard
(elected April 2018)

Ri Leadership Team

Dr Shaun Fitzgerald
Director

Prof Gail Cardew
Director of Science and Education

Katie Cotton
Director of Development (appointed December 2018)

Michael de Crespigny
Director of Finance and Chief Operating Officer

Robert Davies
Head of Communications

Prof Frank James
Head of Heritage and Collections



‘The opportunity to discover and learn over three generations. This was quite unique and I can’t think of another trip we have made with my children and grandchildren that has afforded this opportunity.’

— Family Programme attendee

