PROGRAMME

2018







SCIENCE SUMMER SCHOOL 2018 WITH PROFESSOR BRIAN COX OBE

MAKING BRITAIN THE BEST PLACE TO LEARN AND EXPERIENCE SCIENCE

MONDAY 16 & TUESDAY 17 JULY 2018

Executive Headteacher, Professor Brian Cox OBE & Lord Andrew Mawson OBE

1:30

Welcome

In association with supporters and sponsors we warmly welcome you to our seventh St Paul's Way Trust Science Summer School, hosted by our Patron, Professor Brian Cox OBE.

St Paul's Way Trust School, a 'National Teaching School' and a 'Through School', places science at the

heart of the curriculum with its unique Faraday learning pathway. The aim is to inspire young people to become the next generation of Britain's scientists. Our new sixth form research laboratories, designed by Queen Mary University of London, build on this offer by giving students access to exciting and cutting edge research opportunities such as the Authentic Biology DNA research project.

The opportunities for exciting and innovative careers in Science, Technology, Engineering, Arts and Maths (STEAM) are almost limitless. This year we present an inspirational programme which mixes the best of STEAM subjects through a series of seminars, discussions and hands-on experiments. We are particularly delighted to welcome 400 female students on Day 1 and many students from the north of England as we continue to take the project 'national'.

We hope that you will greet our quest speakers with your usual enthusiasm and make a positive contribution to the various sessions. This is an exciting opportunity to expand your scientific knowledge and gain an appreciation of the importance that science plays in all aspects of our lives.

With determination and an enquiring mind you can see what it is possible to achieve in the future when following a scientific career path.

Phil Akerman **Executive Headteacher** St Paul's Way Trust School



MONDAY 16 JULY at St Paul's Way Trust School

PRACTIC/

ium followed by discussion in Willoughby Theatre

TUESDAY 17 JULY at Plexal Here East

TUESDAY 17 JULY at Plexal Here East

Registration & Refreshments in Plexal Park

Welcome & Introduction in Plexal Theatre: Andrew Roughan – Acting Managing Director, Professor Brian Cox OBE, Lord Andrew Mawson OBE & Phil Akerman – Executive Headteacher, St Paul's Way Trust School

	CBOILD 1.	.01000
11:00	11:00 PRACTICAL WORKSHOPS Session 1 – see Page 5	SPEARR PRESENTATIONS Session 1 Centre Stage 11:00–11:18 Dr Catherine Holloway – The Wonder of Wheelchairs' 11:22–11:40 Dr Emma Marczylo – 'A Day in the Life of a Toxicologist' 11:40–11:50 Audience Q&A with speakers
11:50	11:50 Changeover	
12:00	 12:00 SPEAKER PRESENTATIONS Session 1 Centre Stage 12:00–12:18 Professor Kate Jones – 'Disappearing Wildlife? Technology to the Rescue!' 12:22–12:40 Liana Kafetzopoulou – 'In the Heart of a Viral Outbreak' 12:40–12:50 Audience Q&A with speakers 	PRACTICAL WORKSHOPS Session 1 – see Page 5
12:50	12:50 Lunch	
13:30	13:30 PRACTICAL WORKSHOPS Session 2 – see Page 5	SPEAKER PRESENTATIONS Session 2 Centre Stage 13:30–13:48 Simon Cochrane – 'Design and Technology in the Delivery of Buildings' 13:52–14:10 Professor Alistair Griffiths – 'Growing a Greener Future Through Science' 14:10–14:20 Audience Q&A with speakers
14:20	14:20 Changeover	
14:30	14:30 SPEAKER PRESENTATIONS Session 2 Centre Stage 14:30–14:48 Simon Cochrane – 'Design and Technology in the Delivery of Buildings' 14:52–15:10 Professor Alistair Griffiths – 'Growing a Greener Future Through Science' 15:10–15:20 Audience Q&A with speakers	PRACTICAL WORKSHOPS Session 2 – see Page 5
15:20	15:20 Break	
15:35	15:35 SPEAKER PRESENTATIONS Session 3 Centre Stage 15:35–15:35 Brittany Harris – The Role of Engineers in Achieving a Sustainable Future' 15:57–16:15 Professor Brian Cox – 'Life Beyond Earth' 16:15–16:75 Audienne O&A with sneakers	
16:30 17:00		

PRACTICAL WORKSHOPS (Correct at time of press)

Monday 16 July

ALIEN AUTOPSY Rebeka Khanom / Parveen Rob

AUGMENTED REALITY Said Mohamed / Mustafizur Rahman

CEPHALOPOD BIOLOGY AND SQUID DISSECTION Jake Steers / Christina Pope

CANCER SCREENING Gulnoor Jones / Cherly Braganza

CHEMISTRY WASHBAG Abida Zabin / Fathima Khanom

DRAWING WITH LIGHT Avi Bader / Louise Addison-Pereira

Olivia Connolly / John Blakely ENGINEERING FOR DISASTER RELIEF

DRAMA WORKSHOPS – The World Space Council Debate RAL SPACE with Human ZooCo

HYDRAULICS, MECHANICS AND SMART MATERIALS Andrew Walmsley / Rob Hall

ROBOTICS David Akinrinwa / Ruhul Chowdhury

MAGNETO'S PLAYGROUND Ronan McDonald / Matt Kane

THE WORLD IN WHICH WE LIVE; WATER AND AIR Ramya Rajkumar / Nathaniel Darling / Helen McKenzie

..and don't miss the naked mole-rat display in school foyer

engage with their future potential workforce.

Tuesday 17 July

MOLECULAR GASTRONOMY Amirul Islam / Mohsin Yemani

Physics) RAL SPACE with Alexander Whitley Dance Company DANCE WORKSHOPS – Light Moves (The Dance of Physics)

WESTFIELD STEMBASSADORS, ROLE MODELS, CAREER ADVICE AND AN IMMERSIVE VIRTUAL RALITY EXPERIENCE Unibail-Rodamco-Westfield

UK'S LARGEST 3D PRINTER Hobs Studio

A THRIFTY FIFTY MINUTES London College of Fashion UAL

RAPID PROTOTYPING WITH LITTLE BITS Barclays Eagle Labs

Society, Royal Horticultural Society Agrawal, also joins us to share her experience of helping to build The England, Queen Mary University London, Royal Astronomical and University College London. Shard. Indeed there is a strong The structural engineer, Roma

East for making this possible along

interaction with the schools taking

Olympic Park to encourage

and cultural institutions now moving onto Queen Elizabeth

A Message from

Lord Andrew Mawson OBE

part from east London and also, for the first time, from Bradford. Plexal Here East, our Day 2 host

We thank the teams at Plexal Here

with a host of other organisations.

invaluable support without which Our longterm foundation funder,

> this process enabling 200 students venue, is a vital 'stepping stone' in

Science Summer School, Professor Brian Cox's ambition that Britain

As we celebrate the seventh

is recognised as "the best place

to experience first-hand a state-

of-the art environment designed both big and small to accelerate

never seemed more relevant and

in the world to do science" has

important. Phil Akerman and his

extraordinary team at St Paul's

as a mini-city for companies

joined us offering additional

XL Catlin, continues to provide

to the Park in 2022; architecture design from London College of

Our workshop programme workshops linked to its vast global we could not continue. This year Unibail-Rodamco-Westfield has of education, the sciences and business including Institution of Civil Engineers, Public Health

delivering new retail buildings.

This human contact at ground

Way Trust School continue to rise to the challenge and to ring the

level will help to inspire these

young people to think about

future career pathways and

experience of designing and funding, presentations and

Over the 2 days, we welcome

skills; drama and dance supported by RAL Space who recognise how the sciences and the arts interlink; includes the St Paul's Way science Fashion UAL ahead of their move staff unleashing their formidable

building' theme running through this year's programme.

and engineering from UCL; Hobs Studio at Here East sharing 3D

Labs at Plexal exploring the world printer skills; and Barclays Eagle We continue to work with of prototyping.

the country. This year Carlton Bolling College and Dixons Kings schools and communities across Academy join us from Bradford Foundation in association with with the support of Pears Well North Well Bradford.

This is a year of 'reaching out' and we hope will make us stronger sometime topsy-turvy world. together in this exciting but Lord Andrew Mawson OBE



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we'reach out' to the educational young women raise their career aspirations in STEAM. On Day 2

enable those already operating in the science and tec worlds to







Professor Brian Cox OBE

Professor Cox gained a first class degree in physics from the University of Manchester and was awarded a PPARC Postdoctoral Fellowship. He has worked on a plethora of major projects including the H1 experiment at DESY, HERA, the Tevatron collider in Chicago, POMWIG and the ATLAS experiment at CERN. He was awarded a Chair in Particle Physics at the University of Manchester and through his Royal Society University Research Fellowship continues his work on ATLAS and the public promotion of science.

Brian has received many awards for his work in publicising science. In 2012 he received both the Michael Faraday Prize of the Royal Society for his excellent work in science communication, as well as the Institute of Physics President's medal where he made a speech about the value of education in science and the need to invest more in future generations of scientists. He was appointed an Officer of the British Empire for services to science in 2010 and is a Fellow of The Royal Society.

Professor Cox also has a distinguished career in science broadcasting on television and radio. Programmes that he has written and presented include the BBC documentaries "Wonders of the Solar System", "Wonders of the Universe", "Wonders of Life", "Human Universe", and most recently "Forces of Nature" broadcast on BBC 1 in 2016. He is the coauthor of "Why Does E=mc2?",

the bestselling "Wonders of the Solar System", "Wonders of the Universe", "Wonders of Life", "Human Universe", "Forces of Nature" and "Universal: A Guide to the Cosmos"

Professor Cox was an ambassador for the UK Young Scientists and Engineers Fair, fronting the campaign to promote take-up of STEAM subjects in schools.

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BE A GENIUS
AND YOU DON'T
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DASSAGOR
ITS AND SCIENCE
IS FOR EVERYONE.
IS INTERESTED, AND IF
YOU'RE INTERESTED THEN
YOU CAN DO IT."



Professor Brian Cox OBE



Dr Chris Faulkes

Chris Faulkes began his academic career at the Zoological Society of London, and is currently Reader in **Evolutionary Ecology in the School** of Biological and Chemical Sciences at Queen Mary University of London.

He has worked for over 30 years on the evolution of social and reproductive behaviour in cooperatively-breeding mammals, with particular emphasis on the naked mole-rat. This involves a broad approach, encompassing fields from molecular biology to behaviour and ecology. Recent work has utilised comparative genomic approaches to understand adaptations to a subterranean lifestyle, and the extraordinary biology of the longlived naked mole-rat.

He has published extensively in the scientific literature, co-authored a textbook on African mole-rats and created an exhibition with live naked mole-rats.

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Dr Chris Pearson

Chris Pearson has been interested in space for as long as he can remember and currently works as an astrophysicist researching cosmology and galaxy evolution at RAL Space.

He obtained his degree in Astrophysics from Queen Mary University of London and then a doctorate in Cosmology at Imperial College London and has published over 100 papers on astronomy to date. After obtaining his PhD, he set off to work for the Japanese Space Agency near Tokyo for 7 years on a new space mission to make a map of our Universe in thermal (infrared) light. He returned from Japan in 2007 to work at RAL Space on the European Space Agency's Herschel Infrared Space Telescope.

Currently, he works on a variety of projects including the ARIEL spacecraft to look at the

outside our Solar System), the Square Kilometre Array (SKA) which will be the largest radio telescope ever built and the European/ Japanese SPICA future infrared telescope.

Outside astronomy, Chris is a fully qualified Taekwondo 5th Dan Black Belt international instructor teaching around 150 local students every week.

In his presentation, 'Our Cool Universe', Chris shows how we use infrared light to reveal how galaxies, stars and planets are made in our Universe.





Professor Frances Balkwill OBE

Frances Balkwill is Professor of Cancer Biology at Barts Cancer Institute, Queen Mary University of London. She is especially interested in translating knowledge of cancer biology into new biological treatments for cancer and has published 250+ scientific papers and reviews during her career.

Fran is also Director of the Centre of the Cell, a biomedical science centre for children, educational website and outreach project in east London. There have been more than 160,000 participants in Centre of the Cell activities since opening in September 2009. Together with illustrator Mic Rolph, Fran produced 13 science books for children on cell and molecular biology that have been translated into at least 12 foreign languages with over 500,000 copies sold worldwide.



Sheila Kanani is a planetary physicist, science presenter, secondary school physics teacher and space comedian with a background in astrophysics and astronomy research from UK universities.

Her experience includes acting as an ambassador of science, public speaking, events organisation, science journalism and school visits.

Sheila is currently the Education, Outreach and Diversity Officer for the Royal Astronomical Society in London.

In January 2018, she co-hosted BBC One's "Wonders of the Moon".

Sheila is currently writing her first children's science book.



Roma Agrawal

Roma Agrawal is a structural engineer with a physics degree. She spent 6 years working on The Shard, the tallest building in Western Europe, and designed the foundations and the 'Spire'.

Outside work, she promotes engineering, scientific and technical careers to young people and particularly to under-represented groups such as women. She also engages about these topics with our institutions and government to understand and develop an effective way forward. Over the last 3 years, she has spoken to over 3000 people at over 50 schools, universities and organisations across the country and abroad.

Roma's book "Built - The Hidden Stories Behind Our Structures" was recently published by Bloomsbury and showcases the amazing people and challenges which have been solved through history to create our modern world.

"NOW IS THE TIME TO UNDERSTAND MORE, SO THAT WE MAY FEAR LESS."

Marie Curie.





Dr Cathy Holloway

Dr Cathy Holloway is the Academic Director and co-founder of the Global Disability Innovation Hub (GDI Hub) and Senior Lecturer in UCL's Interaction Centre. GDI Hub exists to accelerate disability innovation for a fairer world and is part of a partnership which has grown out of the London Paralympic Legacy.

Cathy's research revolves around accessibility and innovation, and this naturally crosses traditional discipline boundaries including those of transport, rehabilitation, computer science and entrepreneurship. Cathy has published over 80 peer-reviewed papers and has a current grant portfolio of approximately £1M. This includes work in both the UK and lower to middle-income countries and ranges from prosthetics to inclusive education, from using the Internet of Things to enhance city accessibility and rehabilitation to developing new design methods.

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Dr Emma Marczylo

Dr Emma Marczylo is a Principal Toxicologist in the Toxicology Department at the Centre for Radiation, Chemical and Environmental Hazards, Public Health England.

She spends her time wading through muck, sampling the human body, experimenting in the lab and providing expert opinions.

Emma samples, sequences and shares knowledge to help improve and protect the nation's health.



"SCIENCE AND EVERYDAY LIFE CANNOT AND SHOULD NOT BE SEPARATED."

Rosalind Franklin, Chemist



Professor Kate Jones

Kate Jones is Professor of Ecology and Biodiversity at University College London.

She is a world-leading biodiversity modeller known for her innovative, broad cross-disciplinary research in the linkages between global change, biodiversity and ecosystem services, winning the Philip Leverhulme Prize for outstanding contributions to Zoology in 2008.

Kate holds scientific advisory positions for a number of national and international conservation charities and was the Chair of The Bat Conservation Trust from 2010–2015.

She also directs a number of citizen science projects monitoring biodiversity globally.

She is a passionate science communicator and regularly appears in the national and international media, including the Life Scientific on BBC Radio 4 in 2015. Allegedly, Charles Darwin is her 8th cousin (6 times removed).



Liana is a PhD student at Public
Health England working on genome
sequencing methods for emerging
viruses. Liana is particularly
interested in using this to perform
real-time viral sequencing in the
field, while outbreaks situations are
actually occurring, to understand
how viruses spread from patient
to patient and inform the public
health response.

Science was always her passion but it took a few years to really find what it was she wanted to do. Liana studied chemistry at the University of York before doing an MRes at the University of Nottingham in Advanced Genomic and Proteomic Sciences.

In 2015 she deployed to Guinea with the European Mobile Lab to assist during the 2014–2016 Ebola virus outbreak.

In 2016 she began her PhD and has had the opportunity to work in Nigeria during this year's Lassa virus season, the largest ever recorded.



Initially as a project architect in the 1990's and today as Director of Design for Unibail-Radamco-Westfield, the world's largest retail property company, Simon Cochrane has combined the creative with the commercial throughout his career.

Simon was drawn to commercial design and architecture, developing his skills and knowledge while working on projects like Bluewater and for clients such as John Lewis and Harrods.

Simon has worked for Unibail-Radamco-Westfield since 2000, joining the company as they entered the UK property market, and has been instrumental in helping to take a mall development business and transforming it into what is widely recognised as the world's best retail, leisure and entertainment property company.

During this time Simon has led award-winning design teams for projects in Los Angeles, Milan and at the London 2012 Olympic Games. During this time he has developed a passion for commissioning emerging local design talent, from architects and interiors to furniture and lighting specialists.





Professor Alistair Griffiths

Professor Alistair Griffiths is the Royal Horticultural Society Director of Science & Collections responsible for managing the RHS's team of scientists and sits on the RHS Executive Board. He leads a highly skilled team of scientists focused on undertaking scientific research to provide evidence-based solutions to address environmental and horticultural challenges. Alistair has a First and National Diploma in Horticulture from Myerscough College, obtained his BSc and PhD from the University of Reading and is a Visiting Professor of Royal Holloway University of London.

Alistair is a UK representative on the council of the International Society for Horticultural Science, a Fellow of



the Chartered Institute of Horticulture and of the Royal Society of Biology. He sits on the Ornamental Horticulture Roundtable Group and chairs the UK's Horticultural Scientific Research and Development and Health and Horticulture Forum Group.

Prior to the RHS he was a key player in using horticulture science to create the award-winning Eden Project, spending a decade there as Head Scientist.

Brittany Harris

Brittany studied Civil Engineering at the University of Bristol. On graduating she undertook a 3 month placement with Engineers Without Borders and EcoSwell in Peru, assessing and designing alternative sanitation solutions for a remote fishing community.

In 2016 she became an Institution of Civil Engineers (ICE) future

"SOMEWHERE, SOMETHING INCREDIBLE

IS WAITING TO BE KNOWN."

leader and won the NCE Graduate of the Year award, which she used to catalyse her campaign to engage engineers in their role in achieving the United Nations Sustainable Development Goals. She continues to support ICE in their preparation for the Global Engineering Congress (October 2018), and is an ICE super hero: Water Woman.

Brittany is now CEO of QFlow, a data analytics platform enabling dynamic social and environmental risk management on construction sites.



Lord Andrew Mawson OBE

Andrew is a serial social entrepreneur. He is best known for founding the Bromley-by-Bow Centre in east London, Community Action Network (CAN) and Poplar Harca (one of the first housing companies). Andrew has now "graduated" from most of these ventures and each of them continues as a successful organisation. He has now created Andrew Mawson Partnerships as a vehicle both to grow and replicate his approach and successes.

Under the AMP banner, he launched Water City CIC to create and implement a vision for east London revitalised by the opportunities of the 21st Century and the 2012 Games. Andrew was made a life Peer in 2007 in recognition of the social impact of his work and he now sits as a crossbench Peer in the House of Lords. In 2012, he was made Freeman of the City of London. He is also the best selling author of the book, "The Social Entrepreneur: Making Communities Work".

Andrew, with Paul Brickell and the architect Richard Rogers, wrote the first document proposing the London Olympics in east London; he was involved in the project for 19 years. For 10 years he was a Director of the London Legacy Development Corporation and chaired the Regeneration Committee.

In 2006 Andrew was asked to lead the St Paul's Way Transformation Project. His challenge was to join-up the physical improvements along St Paul's Way by creating new networks and relationships between the agencies and local residents and pursuing a coordinated vision for the future of the area. St Paul's Way Trust School is a key element in this project.



Andrew is now the Executive
Chairman of Well North, a public
health programme which is taking
his experience in east London and
using it to work with local people
to develop pathfinder projects in
10 challenging communities in
10 towns and cities in the North
of England.

Andrew has been leading the Science Summer School programme for 7 years now with Professor Brian Cox and together they continue to both expand the programme and extend its reach.

SPECIAL THANKS

St Paul's Way Trust School is very grateful to principal supporters: XL Catlin, Unibail-Radamco-Westfield and Pears Foundation.

In addition the following organisations have provided invaluable help:

Plexal, Here East, Barclays Eagle Labs, Hobs Studio, London College of Fashion UAL, Voyage Control, University College London (UCL), RAL Space, Institution of Civil Engineers, Well North, Andrew Mawson Partnerships and The London Legacy Development Corporation – Queen Elizabeth Olympic Park.

Thank you to all our speakers for generously giving their time to join us.

Project Management: Richard Mallett Arts Management Ltd
Catering (Day 1) and Project Administration: St Paul's Way Trust School staff and students
Programme Design: Trout Design Ltd

Programme and Event Photography: Elizabeth Norden and Faruk Hussain Complimentary notebooks: Hamelin Brands Ltd – Oxford Black n'Red



Carl Sagan, Astronomer St Paul's Way Trust School (SPWT) is a Royal Society School and the first Faraday Science School in London. We lead the way in delivering an innovative and engaging science curriculum and providing access to state-of-the-art facilities for our students.

The Faraday project is named after the pioneering chemist and physicist Michael Faraday, who himself, grew up and worked in London's East End. Our Faraday status has allowed us to change how science and technology is taught. We provide practical, project-based learning opportunities and encourage our students to develop a lifelong interest in science.

The school underwent a £40 million rebuild as part of the St Paul's Way Transformation Project in Tower Hamlets. In March 2013 Ofsted

graded St Paul's Way Trust School as 'Outstanding' in all categories and in 2014 the school was designated a 'Teaching School' and invited to be part of the Mayor of London's 'Gold Club'

In September 2014 the school became a 'Through School' offering us the exciting prospect of working with others to develop new approaches to primary science. In September 2016 SPWT became the Founding School within the University Schools Trust (UST).

Our annual Science Summer School is an important part of this work introducing young scientists, from our school and partner schools in east London and now from schools in other parts of England, to the work of leading internationally renowned scientists.

Our ambition of fostering links between science, education and the local community has taken another step forward with the recent opening of the St Paul's Way Trust Research Centre. This centre, designed by our lead Trust Partner Queen Mary University of London, enables students from St Paul's Way Trust and other schools to engage in exciting and challenging research, including our 'Authentic Biology' project which has a research focus on diabetes.

The fruit of this innovative work is clear: 98% of SPWT students (August 2017) went on to University pathways with 60% securing places at Russell Group Universities and 67% of students choosing STEM subjects. We continue to look forward to inspiring the next generation through this year's exciting programme.

This Science Summer School is proudly supported by:





























