PROGRAMME

2019

SCIENCE SUMMER SCHOOL

BRITAIN – THE BEST PLACE TO DO SCIENCE

St Paul's Way

Education • Foundation • Trust

SCIENCE SUMMER SCHOOL 2019 WITH PROFESSOR BRIAN COX OBE

MAKING BRITAIN THE BEST PLACE TO LEARN AND EXPERIENCE SCIENCE

THURSDAY 4 JULY 2019

WELCOME

In association with supporters and sponsors we warmly welcome you to our eighth 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 with a focus on Engineering, through a series of seminars, discussions and hands-on experiments.

We are delighted to welcome students from both London and once again from the north of England as we continue to take the project 'national'.

We hope that you will greet our guest 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

THURSDAY 4 JULY at St Paul's Way Trust School – *The Science of Engineering*

Registration & refreshments in Main Atrium
11:10 Welcome & Introduction in Main Atrium – by Phil Akerman, Lord Mawson OBE & Professor Brian Cox OBE

GROUP 1:

11:30 PRACTICAL WORKSHOPS
Session 1 – see Page 4

12:20 Lunch

13:00 PRESENTATIONS
Session 1 Willoughby Theatre
13:00-13:18 Professor Brian Cox – 'Black Holes'
13:22-13:40 Dr Tina Chowdhury – 'Saving Babies' Lives'
13:40-13.50 Audience Q&A with Speakers

13:50 Changeover

14:00 PRACTICAL WORKSHOPS
Session 2 – see Page 4

14:50 Break

15:05 PRESENTATIONS
Session 2 Willoughby Theatre
15:05-15:23 Abbie Hutty – 'Life on Mars – 'Engineering and Science for the Red Planet'
15:27-15:45 Andrew Smyth – 'When Baking Meets Engineering'
15:45-15:55 Audience Q&A with Speakers
15:55 Groups 1 & 2 changeover

15:55 Changeover

16:05 PRACTICAL WORKSHOPS
Session 3 – see Page 4

GROUP 2:

PRESENTATIONS
Session 1 Willoughby Theatre
11:30-11:48 Professor Brian Cox – 'Black Holes'
11:52-12:10 Dr Steve Le Comber – 'Rockets, Parakeets and a Modern Art Mystery: Mathematical Connections'
12:10-12:20 Audience Q&A with Speakers

PRACTICAL WORKSHOPS
Session 1 – see Page 4

PRESENTATIONS
Session 2 Willoughby Theatre
14:00-14:18 Ayotunde Sokale – 'Could You Be a Civil Engineer?'
14:22-14:40 Professor Andrew Hudson-Smith – 'Talking Trees, Chatty Gnomes and the Time Telephone: From Oxfam to the Olympic Park and the Victoria and Albert Museum – Building The Internet of Things'
14:40-14:50 Audience Q&A with Speakers

PRACTICAL WORKSHOPS
Session 2 – see Page 4

PRESENTATIONS
Session 3 Willoughby Theatre
16:05-16:23 Dr Kathryn Harkup – 'Murder is Easy'
16:27-16:45 Professor Becky Parker – 'How You Can Change the World Right Now With Engineering'
16:45-16:55 Audience Q&A with Speakers

16:55 Groups 1 & 2 meet in Main Atrium
17:05 Closing Address & Awards with Professor Brian Cox
17:30 Close of SSS 2019

EVENING RECEPTION in Main Atrium hosted by Professor Brian Cox
19:00 Guests arrive
19:45 Welcome and Introduction
20:00 Discussion and 'Meet the Speakers' with Professor Brian Cox
21.00 Close

"SOMEWHERE, SOMETHING INCREDIBLE IS WAITING TO BE KNOWN."

Carl Sagan, Astronomer

PRACTICAL WORKSHOPS

ALIEN AUTOPSY Rebecca Khanom/ Gulnoor Jones	**CUSTARD ROCKETS** Dr John Baum/ Mariam Ahmed	**ELEGANT ENGINEERING OF THE EYE** Cheryl Braganza/ Fatih Duzgan	**ROBOTICS** Ruhul Chowdhury/ Abu Tufail
AUGMENTED REALITY Bethany Claphm/ Mohamed Said	**DESERT ISLAND CHALLENGE** Haarjira Hussain/ Parveen Rob	**ENGINEERING MATERIALS** Ronan McDonald/ John Blakely	**SCIENCE OF METEROLOGY** Nathaniel Darling/ Ramya Rajkumar
BIOMIMICRY Olivia Connolly/ Shanur Miah	**DESIGNING DYES** Mustafizur Rahman/ Nourane Clostre	**HYDRAULICS, MECHANICS AND SMART MATERIALS** Andrew Walmsley/ Farhana Choudhry	**THE PEOPLE'S MOON** Helen Marshall/ Anna Pawlowicz
CHEMISTRY WASHBAG Abida Zabin/ Latasha Amisial	**ELECTROPHORESIS** Christina Wheate/ Jake Steers	**PLANTS AS AIR CONDITIONING** Tijana Blanusa/ Ioannis Chatzipetrou	

A MESSAGE FROM LORD ANDREW MAWSON, OBE

'...one small step for man, one giant leap for mankind'

2019 is an important year as we celebrate two significant events in the science world, one looking back into our history and one looking forward into our future.

- 20 July 2019 marks the 50th anniversary of the Apollo moon landing when astronauts Neil Armstrong and Buzz Aldrin became the first humans to walk on the moon on 20 July 1969
- 4 July 2019 marks our eighth St Paul's Way Trust Science Summer School hosted by Professor Brian Cox OBE

Everyone on earth has a dream. The Apollo mission achieved an 'impossible' dream and a giant leap for humanity when two humans walked on the surface of the moon. It took 400,000 people in total to make this dream happen so it was a great team effort! It also captured imagination on a global scale and stimulated a wide range of innovative science and technology endeavours.

By celebrating this past achievement, we hope to encourage future generations to dream the impossible again. On July 4, we look forward to an inspirational day here at St Paul's Way Trust School involving 400 young people and experts from across the sciences. We are also very pleased to host The People's Moon workshops as part of the Apollo 50 celebrations worldwide.

Together we will explore ideas about making our planet a better place through science and engineering. In so doing we will work towards Professor Cox's ambition that Britain is recognised as "the best place in the world to do science".

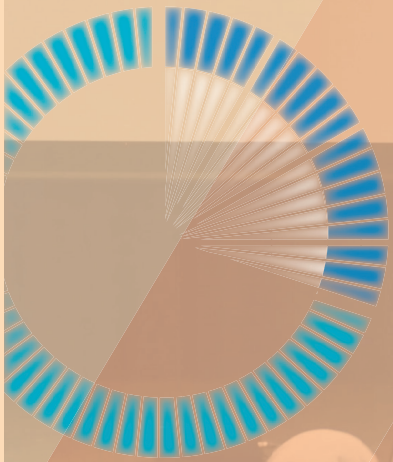
Spreading the STEAM message is what Science Summer School is all about and we are delighted to welcome students from St Paul's Way Trust School and 30 schools from across East London. Our continuing partnership with Well North Enterprises supports visits this year from schools in Rotherham and Skelmersdale. They will start their own Science Summer Schools in 2020/21 funded with the help of the Royal Commission for the Exhibition of 1851.

Helping us to make our own 'giant leap' in London is AXA XL who have supported Science Summer School since its inception with our grateful thanks.

This year we are delighted to welcome Ibstock PLC supporting our core science and education programme from an engineering and building perspective as well as a special workshop on July 5 to help our northern schools to start planning their own future events.

Our thanks as well to Phil Akerman, Executive Headteacher and his incredible team at St Paul's Way Trust School for believing in and supporting this annual project.

We all hope that Science Summer School will help inspire students to reach for the stars in their lives.



"ALL OF OUR GUEST SPEAKERS HAVE BEEN GIVEN **18 MINUTE TIME SLOTS** FOR THEIR PRESENTATIONS.

WHY 18 MINUTES?

IT'S LONG ENOUGH TO BE SERIOUS AND SHORT ENOUGH TO HOLD PEOPLE'S ATTENTION.

IT'S A FORMAT THAT HAS BEEN ADOPTED BY THE ONLINE **TED LECTURES** AND HELPS ENSURE THAT SPEAKERS CONVEY THEIR KEY POINTS IN AN **INFORMATIVE** AND **INTERESTING** WAY".

"YOU DON'T HAVE TO BE A GENIUS AND YOU DON'T HAVE TO BE A MAN – SCIENCE IS FOR EVERYONE. ALL YOU NEED TO BE IS INTERESTED, AND IF YOU'RE INTERESTED THEN YOU CAN DO IT."

Professor Brian Cox OBE

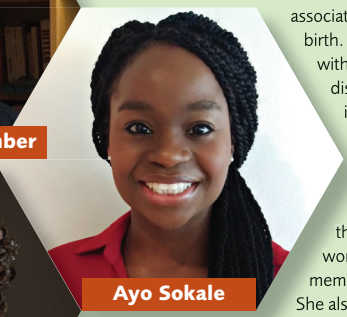
PROFESSOR BRIAN COX OBE

Professor Brian Cox MBE is Professor of Particle Physics at The University of Manchester, The Royal Society Professor for Public Engagement in Science and a Fellow of the Royal Society. As a broadcaster, he has presented a number of highly acclaimed science programmes for the BBC, boosting the popularity of subjects such as astronomy and physics and garnering a host of accolades, including two Royal Television Society awards and a Peabody Award for *Wonders of the Solar System*. He has also authored a series of best-selling books, including the widely acclaimed *Human Universe and Universal: A Guide to the Cosmos*, and is recognised as the foremost communicator for all things scientific. His critically acclaimed BBC series, *Forces of Nature*, aired in 2016, and he will host a new series of *Stargazing Live* later this year. He holds two Guinness World Record titles for a science tour for his total sell-out debut tour, which began in 2016 and saw over 150,000 attend in total, including a sell-out show at Wembley Arena. His latest live tour, *Universal: Adventures in Space and Time*, is taking in venues around the world throughout 2019. Brian's brand new series *The Planets* began transmitting in May 2019.

BIOGRAPHIES

Dr Steve Le Comber

Dr Tina Chowdhury



Ayo Sokale

DR STEVE LE COMBER

Steven Le Comber is a senior lecturer in the School of Biological and Chemical Sciences at Queen Mary University of London. Most of Steve's research focuses on the mathematics of spatial patterns, particularly in understanding and combatting disease outbreaks. In this talk, though, he will explain how the same underlying mathematics can have some surprising applications – from a Second World War British Secret Service operation designed to deceive the Germans about the accuracy of the V-2 rocket bombardment on London, to understanding the origins of London's ring-necked parakeets or helping to identify Banksy! This will be his sixth appearance at the St Paul's Way Trust Summer Science School.

DR TINA CHOWDHURY

Tina is a Bioengineer at Queen Mary University of London (www.tinachowdhury.com). She is developing new ways to repair defects in the fetal membranes which could prevent the life-long medical conditions and disabilities associated with pre-term birth. Tina works with a global multi-disciplinary team involving doctors, scientists and engineers, to address the weakness in the tissues in the womb and prevent membrane rupture. She also helps women who experience pre-term births feel more confident about their pregnancies so that they can deliver babies to full term.

Tina has received several Awards for her research in promoting Bioengineering to children and young people. In the last four years, she received funding annually from the Centre for Public Engagement where she developed engagement programmes called the "Bioengineering Experience" and "Staying Strong-Joints in Space". In 2016, she received the Gold Award from the Reimagine Education for innovations in developing the virtual lab and in 2018, she received the Ingenious Award from the Royal Academy of Engineering.

Tina has appeared on the radio and presented her research with Claudia Hammond from the BBC News World Service, Robyn Williams from the ABC The Science Show and with Dr Nick Chris from The Naked Scientists (https://www.bbc.co.uk/sounds/play/p077kmvf).

Tina's talk will discuss the exciting aspects of her research and explain the journey she took to becoming a British Bangladeshi Woman and Ambassador promoting subjects in STEAMM to young people at schools.

Follow @ttchowdhury

AYO SOKALE

Ayo is a Project Manager and the BIM lead for the Environment Agency's Collaborative Delivery Framework Eastern Hub (Thames Valley, East Anglia and Herts and North London).

Previously, she was a Graduate Civil Engineer on the Environment Agency's training scheme where she undertook internal and external placements to support her development. During this, she project managed the Abingdon Flood alleviation scheme which delivered a flood wall that protected 5 properties from flooding and was assistant project manager on Oxford flood alleviation scheme where she led on assurance and approvals. She gained invaluable site experience in the role of ECC site supervisor for the Tull Way flood alleviation scheme. She has also managed and designed project such as a by-pass channel to improve fish migration and flood embankments. She worked on the UK Government's top 40 national infrastructure projects and one of world's largest flood risk management programmes, The Thames Estuary Asset Management 2100.

This all enabled her to sign off her ICE training agreement in 2.5 years and she is working toward achieving Chartered Engineer status.

Ayo was selected as one of Professor Lord Robert Mair's Future Leaders for his year as President of the ICE. She was nominated for the Top 50 Women in Engineering under 35 (WE50) initiative run by The Telegraph in partnership with The Women's Engineering Society (WES) (June 2017).

She is a STEM ambassador and mentor encouraging other to take up careers in Civil Engineering. She believes Civil Engineer should actively take part in civil life and she is an elected Councillor at Reading Borough Council.

"SCIENTISTS INVESTIGATE THAT WHICH ALREADY IS; ENGINEERS CREATE THAT WHICH HAS NEVER BEEN."

Albert Einstein

Professor Andrew Hudson-Smith

Abigail Hutty

Dr Kathryn Harkup

Andrew Smyth

Professor Becky Parker

PROFESSOR ANDREW HUDSON-SMITH

Professor Andrew Hudson Smith is Professor of Digital Urban Systems at The Bartlett Centre for Advanced Spatial Analysis, University College London. He is also a Visiting Professor, University of Plymouth School of Art, Design and Architecture and a member of the Mayor of London Smart London Board. He is a great believer that anything and everything can be learnt by anyone and that the process should always be fun (even at his age).

ABIGAIL HUTTY

Abbie saw a story in the news when she was doing her GCSEs – British Engineers were building a probe for Mars! Inspired by that she decided to study engineering. After graduating Abbie joined Airbus Defence and Space as a Mechanical Engineer and soon moved to work on the ExoMars rover – Europe's first Rover for Mars! She worked as lead Structures Engineer for the Rover, coordinating a team of design specialists, responsible for the structure design meeting all the complex requirements to work on Mars, then took the role of Platform Delivery Manager for the Rover. In this role she is responsible for all of the subsystems on the Rover being delivered, tested and integrated together to create the finished Rover.

ANDREW SMYTH

Andrew is an aerospace engineer, baker and presenter. As a finalist on the Great British Bake Off in 2016, he grew a firm following for his innovative creations combining his passions of engineering and baking.

A graduate of the University of Cambridge, Andrew now divides his time between researching Future Aircraft at Rolls-Royce, teaching patisserie classes and sharing his take on "bakineering": exploring engineering through baking. He has written, produced and performed live shows around the UK and Ireland including at the Royal Institution and Edinburgh International Science Festival.

Since leaving the tent, he's presented a live cooking segment on ITV's and has worked on baking projects with the BBC, Warner Brothers and the British Council. He has even baked a rotating jet engine for Prince William.

DR KATHRYN HARKUP

Kathryn Harkup is a chemist and author. Kathryn completed a doctorate on her favourite chemicals, phosphines, and went on to further postdoctoral research before realising that talking, writing and demonstrating science appealed more than working in a lab. For six years she ran outreach in engineering, computing, physics and maths at the University of Surrey, which involved writing talks and workshops on science topics that would appeal to school students (anything disgusting or dangerous was usually the most popular). Kathryn is now a freelance science communicator delivering talks and workshops on the quirky side of science. She is the author of *A is for Arsenic: The Poisons of Agatha Christie* and *Making the Monster: The Science of Mary Shelley's Frankenstein*.

PROFESSOR BECKY PARKER

After a physics degree and research at the University of Chicago, Becky taught in a variety of schools and found when she offered genuine research opportunities to her students they thrived in the subject. Setting up the Institute for Research in Schools (IRIS) was to scale this approach across the county and there is huge enthusiasm for authentic science from both school students and teachers. IRIS is based at the Science Museum and Becky's teaching base is in Sheffield.

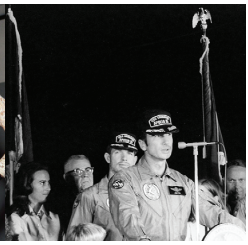
Becky was awarded an MBE in 2008. She is Visiting Professor in the School of Physics and Astronomy at Queen Mary, University of London. In the summer of 2016 she was awarded the Kavli Education Medal from the Royal Society.



MAKE A GIANT LEAP

On July 20, 1969, Apollo 11 fulfilled the dreams of humanity by landing on the moon. "That's one small step for man, one giant leap for mankind" – Neil Armstrong.







TAKE PART

Now it's your turn! To celebrate the 50th Anniversary of this achievement we'll put you on the moon!

- Send us your photos and selfies
- Tell us your stories
- What is your giant leap?

thepeoplesmoon.com

#thepeoplesmoon

#mygiantleap

#apollo50

THE PEOPLE'S MOON

Everyone on earth has a dream. The Apollo mission achieved an 'impossible' dream and a giant leap for humanity when two humans walked on the surface of the moon. It took 400,000 people in total to make this dream happen so it was a great team effort! It also captured imagination on a global scale and stimulated a wide range of innovative science and technology endeavours.

By celebrating this past achievement, we hope to encourage future generations to dream the impossible again. On July 4, we look forward to an inspirational day here at St Paul's Way Trust School involving 400 young people and experts from across the sciences. We are also very pleased to host The People's Moon workshops as part of the Apollo 50 celebrations worldwide.

Together we will make our very own 'Apollo 50th' photo mosaic together led by artist Helen Marshall of The People's Picture using historic photos and our selfies captured on the day, and this will be exhibited on a giant touchscreen, on the website and in global locations. We will explore ideas about making our planet a better place through science and engineering. In so doing we will work towards Professor Cox's ambition that Britain is recognised as "the best place in the world to do science".

Lord Andrew Mawson OBE

THE PEOPLE'S MOON

We all have a giant leap. What's yours?

BIOGRAPHIES

Lord Andrew Mawson OBE

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". This book has just been published in Japan in Japanese.

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 Enterprises, 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 8 years now with Professor Brian Cox and together they continue to both expand the programme and extend its reach.

"WHAT WE USUALLY CONSIDER AS IMPOSSIBLE ARE SIMPLY ENGINEERING PROBLEMS... THERE'S NO LAW OF PHYSICS PREVENTING THEM."

Michio Kaku, Theoretical Physicist

SPECIAL THANKS

SPECIAL THANKS

St Paul's Way Trust School is very grateful to principal supporters:
XL AXA, Ibstock

In addition the following organisations have provided invaluable help:
Well North, Andrew Mawson, Queen Mary University of London

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

Project Management: Richard Mallett Arts Management Ltd
Catering 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

Black n' Red

RICHARD MALLETT arts MANAGEMENT

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 2018) went on to University pathways with 60% securing places at Russell Group Universities and 60% 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:

AXA

Andrew Mawson Partnerships

Ibstock
At the heart of building

UCL

ice 200

THE INSTITUTE for RESEARCH in Schools

Well North

Queen Mary University of London

the People's Picture

RHS
Inspiring everyone to grow

and **St Paul's Way CIC** **www.stpaulsway.com**