PROGRAMME

SCIENCE SUMMER SCHOOL

BRITAIN – THE BEST PLACE TO DO SCIENCE

St Paul's Way
Trust School

ST PAUL'S WAY TRUST SCIENCE SUMMER SCHOOL WITH PROFESSOR BRIAN COX OBE

MAKING BRITAIN THE BEST PLACE TO LEARN AND EXPERIENCE SCIENCE

THURSDAY 29 AUGUST – FRIDAY 30 AUGUST 2013

Welcome

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

At St Paul's Way Trust School, we are proud of our status as London's first Faraday specialist science school. We are committed to inspiring young people to take a life-long interest in science and encouraging the next generation of Britain's scientists through innovative teaching methods and a practical and investigative approach to learning. This Science Summer School offers students who are passionate about science to interact with some of Britain's leading scientists and engineers through a programme of seminars, discussions and hands-on experiments. This year we welcome a programme that mixes the best of both science and engineering. This exciting mix is extended even further by the second half of the programme for day two which will take place at Siemens' 'Crystal' building at the Royal Victoria Docks.

We hope you will welcome 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.

PROGRAMME

THURSDAY 29 AUGUST

13.00 Registration
13.45 Welcome and Introduction by Professor Brian Cox

Session One 'Universe' 14:00 – 15:30

14:00 **'Exploring the Universe from the Smallest Building Blocks to the Largest Clusters of Galaxies'** – Professor Brian Cox & Professor Jon Butterworth
14:36 Q&A Session and general discussion
14:50 Student presentation
14:55 Practical activity/demonstration

15:30-15:45 - Break

Session Two 'Space' 15:45 – 17:15

15:45 **'Space is 'Virgin' Territory'** – Stephen Attenborough
16:03 **'Exomars: Engineering for the Red Planet'** – Paul Meacham
16:21 Q&A session and general discussion
16:35 Student presentation
16:40 Practical activity/demonstration

17:15 Close Day One

Evening Reception 19:00 – 21:00

Welcome – Grahame Price, Headteacher

'The human story behind a career in science' – Informal discussion with all speakers led by Professor Brian Cox

FRIDAY 30 AUGUST

09:00 Registration

Session Three 'Climate Science' 09:25 – 10:55

09:25 **'Do we understand Earth's climate?'** – Dr. Tamsin Edwards
09:43 **'Why I should care about ocean currents'** – Dr. Mark Brandon
10:01 Q&A Session and general discussion
10:15 Student presentation
10:20 Practical activity/demonstration

10:55-11:10 - Break

Session Four 'Health' 11:10 – 12:00

11:10 **'You are what you eat'** – Professor John Wass
11:28 **'The Diabetes Epidemic' – Origins and Prevention** – Professor Graham Hitman
11:46 **'Diabetes research project'** – Authentic Biology Research Team Q&A session and general discussion

12:00-13:00 – Lunch

12:45-14:00 – Transport to Siemens Crystal

"Building on Professor Cox's ambition that Britain is the best place to 'do science', the Lower Lea Valley in East London presents us with an important opportunity and context to explore the relationship between science, education, business, and aspiration. There is a need for future developments in the Lower Lea Valley to build upon a rich history of science, engineering, and innovation. It is equally important to connect education, aspiration, and employment for local people into these burgeoning opportunities. Professor Cox and a representative from the Royal Society will lead a conversation around these themes and the Siemens Crystal reception is an opportunity to continue this discussion".

Lord Mawson OBE.

Session Five 'Engineering Past and Present' 14:00 – 14:50

14:00 **'Soundforms'** – Jason Flanagan
14:18 **'The Mother of Invention'** – David and Nishani Kampfner
14:36 Q&A session and general discussion

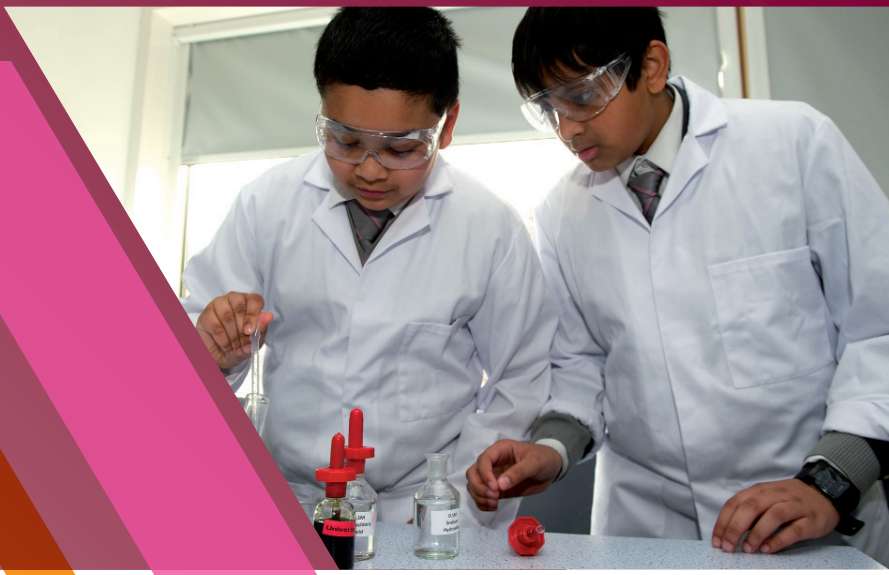
14:50-15:10 – Break

15:10 **'Engineering Everywhere'** – Rhodri Evans
15:28 **'Tunnelling for Crossrail – Building a better London'** – Professor Robert Mair
15:46 Q&A session and general discussion

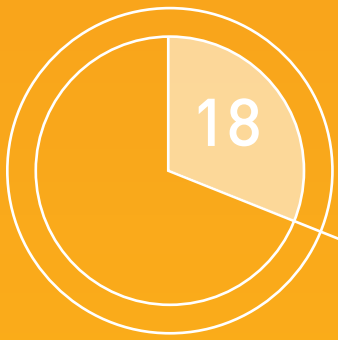
16:00 Closing remarks

16:15-16:30 – Transport to St Paul's Way Trust School

16:30 Reception at Siemens Crystal

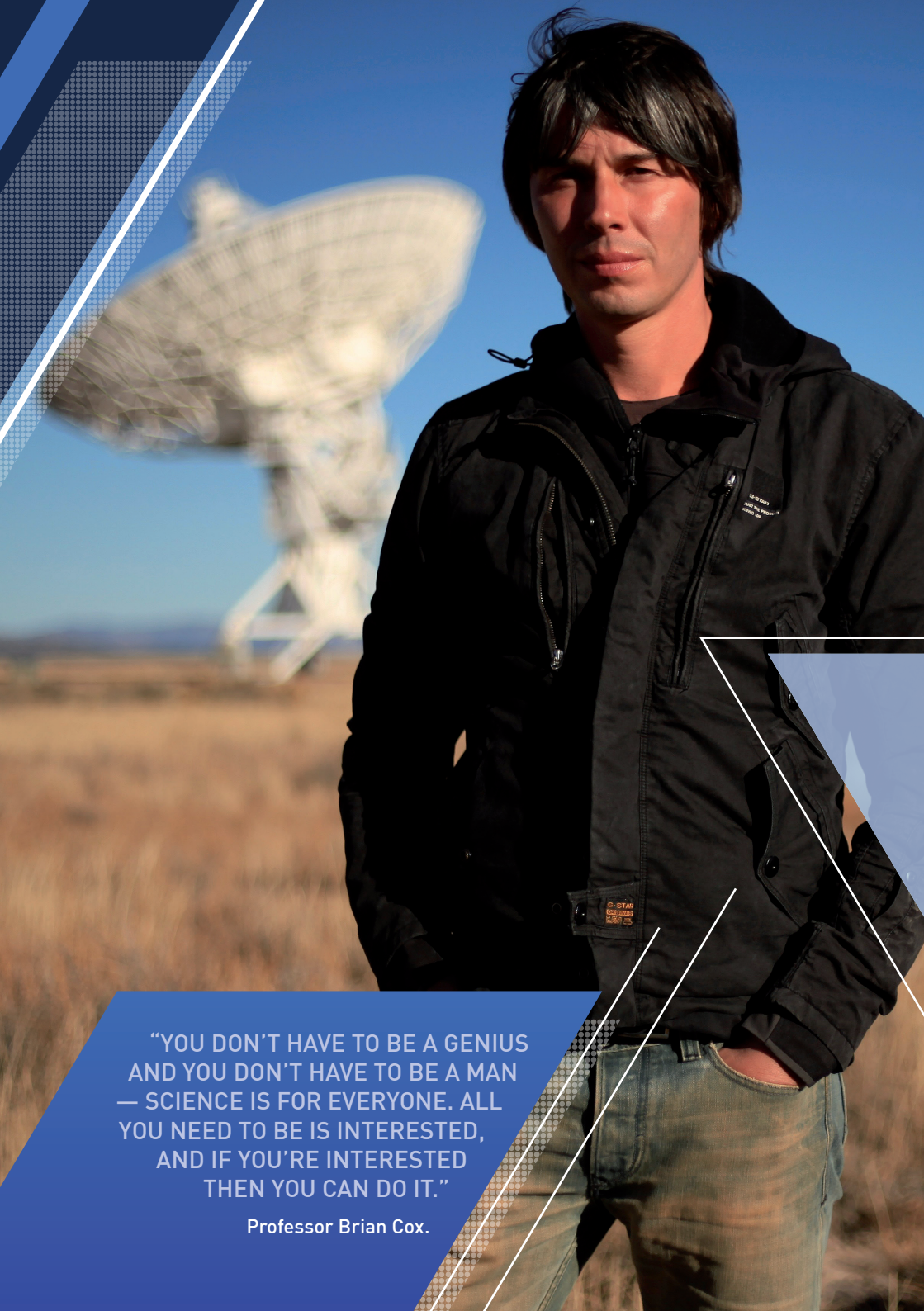


"ALL OF OUR **GUEST SPEAKERS** HAVE BEEN GIVEN 18 MINUTE TIME SLOTS FOR THEIR **PRESENTATIONS**. WHY **18 MINUTES**? IT'S LONG ENOUGH TO BE SERIOUS AND SHORT ENOUGH TO HOLD PEOPLE'S ATTENTION. IT'S A FORMAT THAT HAS BEEN ADOPTED BY THE ONLINE **TED LECTURES** AND HELPS ENSURE THAT SPEAKERS CONVEY THEIR KEY POINTS IN AN **INFORMATIVE** AND **INTERESTING** WAY".



"THE WORLD OF SCIENCE AND ENGINEERING IS OPEN TO EVERYONE – AND THERE IS A GREAT VARIETY OF JOBS ALL OVER THE UK, AT ALL LEVELS AND IN LOTS OF SURPRISING ENVIRONMENTS".

Diana Garnham,
Chief Executive of the Science Council.



"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.

BIOGRAPHIES

Professor Brian Cox

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 including the British Association Lord Kelvin Prize in 2006 and the Institute of Physics Kelvin Medal and Prize in 2010. He was appointed an Officer of the British Empire for services to science in 2010.

Professor Cox also has a distinguished career in science broadcasting on television and radio. He wrote and presented the BBC documentaries "Wonders of the Solar System" and "Wonders of Life".

He is an ambassador for the UK Young Scientists and Engineers Fair 2011, fronting the campaign to promote take-up of STEM subjects in schools. He speaks regularly for the GCSE "Science Live" initiative and was keynote speaker at the Chatham House "Investing in Science" conference in 2010.

Professor Cox is the co-author of "Why Does $E=mc^2$?" and the bestselling "Wonders of the Solar System" and "Wonders of Life".

BIOGRAPHIES

Professor Jon Butterworth

Professor Jon Butterworth is head of the Department of Physics and Astronomy at University College London, and a member of the ATLAS experiment at CERN's Large Hadron Collider. Before this, he grew up in Manchester, did his doctorate in Oxford and worked on the electron-proton collider in Hamburg. He also writes the "Life and Physics" blog for the Guardian.

Stephen Attenborough

Stephen Attenborough is the Commercial Director for Sir Richard Branson's Virgin Galactic – the world's first commercial Spaceline.

As its first full time employee, Stephen provides a unique insight into how and why this amazing project first saw the light of day and with the help of stunning images and footage, will chart its progress to date, including the latest from the on-going test flight programme. Stephen will also explain how Virgin Galactic as a business is balancing and aiming to meet its dual objectives of safety and commercial viability. He will describe how success in these areas could provide the spark to light the fire of a new, important and vibrant industry; an industry that could help to meet some of the most pressing challenges faced back down on Earth in the coming decades. Most importantly Stephen will set out why travelling to space with Virgin Galactic will be a profound, exhilarating and life-changing experience.

Paul Meacham

Paul studied Physics with Space Science and Technology at Leicester University, before joining Astrium's Graduate Development Programme (GDP) in September 2006. Following the completion of the GDP in 2008, he joined the ExoMars Rover Vehicle Project and was initially responsible for the project's prototype models, in particular the Locomotion Performance Model (LPM) used in the development of the autonomous drive capability. He has subsequently moved into System Engineering on the same project and is currently responsible for the requirements and verification management of the Rover Vehicle.

Dr. Tamsin Edwards

Tamsin is a climate scientist in the School of Geographical Sciences at the University of Bristol. She did an undergraduate degree in physics and a PhD in particle physics at the University of Manchester, then moved into climate science in 2006. Her research uses computer models to understand climate change, both past and future, and what impacts it has on sea level and the environment. She is particularly interested in how confident we can be in our predictions of the future.

"THE UK NEEDS AN ANNUAL MINIMUM OF 100,000 GRADUATES IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS (STEM) JUST TO KEEP THE ECONOMY LEVEL."

Royal Academy of Engineering 2012

BIOGRAPHIES

Dr Mark Brandon

Dr Mark Brandon has worked in polar research since 1992, with the Scott Polar Research Institute, the British Antarctic Survey and now The Open University, and he has visited the high latitudes many times. As a research scientist his interests are in how the ocean is affecting the great polar ice sheets and he has published more than 35 research articles in leading journals. Mark has always had a strong interest in the public understanding of science and has worked in the background on many polar television series – the most recent being the BBC Frozen Planet series where he was the principal academic advisor.

In 2012, Mark was awarded the prestigious Most Innovative Teacher of the Year Award, sponsored by the Higher Education Academy for his passion and approach to teaching that has inspired record numbers of students to register for courses in polar science.

Professor John Wass

John Wass is the Professor of Endocrinology at Oxford University and was Head of the Department of Endocrinology at the Oxford Centre for Diabetes, Endocrinology and Metabolism, Churchill Hospital Oxford, UK until 2011. He qualified at Guy's in 1971 and did his endocrine training at Bart's. He got his MD from the University of London in 1980. From 1989 he was Professor of Clinical Endocrinology and Sub-Dean of University of London at Bart's. He moved to Oxford in 1995. John Wass is Vice President of the Royal College of Physicians.

His research interests include all pituitary tumours, especially acromegaly, adrenal disease, angiogenesis in endocrinology, and the genetics of osteoporosis and thyroid disease.

Since 1975 he has published over 350 articles in scientific journals and as well as written many reviews and chapters in textbooks. He was editor of Clinical Endocrinology until recently and is on the Editorial Board of numerous journals. He was President of the European Federation of Endocrine Societies from 2001-2003 and was Chairman of the Society for Endocrinology (2006-2009. He has also served as President of the Pituitary Society.

He has won a number of prizes and given named lectures including the Jubilee Prize of the Society for Endocrinology. In June this year he was awarded the Distinguished Physician of the Year Award by the American Endocrine Society, the first non-American to ever receive this award.

He is Academic Vice President of the Royal College of Physicians in London, since August 2012.

Professor Graham A Hitman MB BS MD FRCP (Lond)

Graham Hitman is Professor of Molecular Medicine and Diabetes at Barts and The London School of Medicine and Dentistry, Queen Mary University of London and Consultant Diabetologist at Barts Health NHS Trust. He is Editor-in-Chief of Diabetic Medicine.

His main research interests are the genomics of type 2 diabetes and prevention strategies, especially in people from South Asia. He is also one of the principal investigators of the CARDS (Collaborative Atorvastatin Diabetes Study) trial that has influenced the development of current lipid lowering guidelines in diabetes. He has over 250 peer reviewed publications.

Lord Andrew Mawson

Andrew is a serial social entrepreneur. He is best known for founding the Bromley-by-Bow Centre in East London, Community Action Network (CAN), Poplar Harca (one of the first housing companies) and Leaside Regeneration Ltd. 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.

Recently, under the AMP banner, he co-founded One Church 100 Uses CIC and launched Water City Group to create and implement a vision for East London revitalised by the opportunities of the 21st Century and the 2012 Olympic Games.

Andrew was made a life Peer in 2007 in recognition for the social impact of his work and he now sits as an independent crossbench Peer in the House of Lords. In 2012, he was made a Freeman of the City of London. He is also the best-selling author of the book, "The Social Entrepreneur: Making Communities Work."

Over a decade ago Andrew and his partners wrote one of the earliest papers proposing that the Olympics Games be brought to East London. He is today a Director of the London Legacy Development Corporation. Over the next 25 years, this company will plan, develop, and manage the Olympic Park in East London and create a lasting legacy from the 2012 Games.

For Andrew, nothing is impossible. His favourite saying is, "live dangerously or do not live at all."

"BETWEEN 2010 AND 2020, ENGINEERING COMPANIES ARE PROJECTED TO HAVE 2.74 MILLION JOB OPENINGS ACROSS DIVERSE RANGE OF DISCIPLINES".

UK Engineering Report 2013

BIOGRAPHIES

Jason Flanagan

Jason is the Design Director of Flanagan Lawrence, a firm of Architects and Masterplanners who specialise in projects related to sound.

Jason studied architecture at the Bartlett School of Architecture at London University and at the Royal College of Art. During his studies he worked for Conran Roche Ltd and Armstrong Associates. He joined Foster + Partners in 1991 and in 1995 Jason was made Associate, delivering designs for a 3,000-seat conference centre at the Scottish Exhibition and Conference Centre in Glasgow. In 1997 he became Project Director for the Sage in Gateshead, a music centre comprising two performance spaces, a rehearsal hall and a music school. He was made Partner at Foster + Partners in 2004. Flanagan Lawrence was formed in 2013.

Jason has a special interest in acoustics and sound. Amongst his most innovative Flanagan Lawrence projects is Soundforms, the first-ever mobile acoustic shell with the capacity for a full orchestra. This modular structure not only shelters performers, but allows musicians to hear themselves and projects sound to the audience.

Nishani & David Kampfner

Nishani and David Kampfner are two individuals whose tenacity, ingenuity and fight against the odds has taken SS Robin from a forgotten relic of the past to a London visitor attraction and floating museum at the western end of the Royal Victoria Dock. SS Robin is a precious diamond, a national treasure and one of London's best kept secrets. SS Robin is the world's oldest complete steamship and the last of her type in the world. She's a survivor, with a life spanning three centuries and an amazing story to tell. SS Robin was built in 1890 at the world renowned Thames Ironworks shipyard on the River Lea, where many notable vessels - including the illustrious HMS Warrior - were built.

The husband and wife partnership, once more famous for their photographic skills, are no strangers to all things sea-faring having owned and lived on boats for many years.

Rhodri Evans

Rhodri Evans is a Graduate Mechanical Engineer and runs the STEM Ambassadors team for Siemens Metals Technologies in Sheffield. Rhodri is passionate about inspiring young people about careers in engineering.

Professor Robert Mair

Robert Mair is the Sir Kirby Laing Professor of Civil Engineering and Head of Civil and Environmental Engineering at Cambridge University. He was Master of Jesus College 2001-2011 and Senior Vice-President of the Royal Academy of Engineering 2008-2011. Before he was appointed to a Professorship at Cambridge in 1998 he worked in industry for 27 years, in 1983 founding the Geotechnical Consulting Group, an international consulting company based in London. He was appointed Chief Engineering Adviser to the Laing O'Rourke Group in 2011.

His research group at Cambridge specialises in the geotechnics of tunnelling and underground construction. He has advised on numerous tunnelling projects in the UK and worldwide, including the Jubilee Line Extension project for London Underground. He advised on the technique of compensation grouting to protect Big Ben from movement due to tunnelling. He has been closely involved with the Crossrail project, Europe's largest civil engineering project, and is a member of its Engineering Expert Panel.

Professor Mair also leads the Centre on Smart Infrastructure and Construction at Cambridge, involving the innovative use of the latest sensor technologies to monitor the behaviour of civil engineering infrastructure. He chaired the Royal Society/Royal Academy of Engineering Report on Shale Gas for the UK Government, published in 2012. He was elected a Fellow of the Royal Society in 2007 and awarded the CBE in 2010 for services to Engineering.

"SCIENCE, TECHNOLOGY AND INNOVATION ARE VITAL TO IMPROVING HEALTH AND THE QUALITY OF LIFE AND FOR ECONOMIC GROWTH".

Royal Society 2013

St Paul's Way Trust School is the **first Faraday Science School in London**.

In March 2013 Ofsted graded St Paul's Way Trust School as 'Outstanding' in all categories. We are the first Faraday Science School in London leading 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 in London and worked in the East End. As part of the St Paul's Way Transformation Project in Tower Hamlets, the school has undergone a **£40 million rebuild**. 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. Our annual Science Summer School is an important part of this work introducing young scientists, from our school and a range of other partner schools, to the work of leading internationally renowned scientists.

This year our ambition of fostering links between science, education and the local community will soon take another step forward with the opening of the St Paul's Way Trust Research Centre. This centre, designed by our lead Trust Partner Queen Mary, University of London, will enable students from St Paul's Way Trust and other schools to engage in exciting and challenging research, including our Wellcome Trust funded 'Authentic Biology' project; our research focus within the centre is 'Type 2 Diabetes'.

The Science Summer School is proudly supported by

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Andrew Mawson Partnerships

LONDON LEGACY DEVELOPMENT CORPORATION

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