PROGRAMME

SCIENCE SUMMER SCHOOL

BRITAIN – THE BEST PLACE TO DO SCIENCE

St Paul's Way
Trust School

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

MAKING BRITAIN THE BEST PLACE TO LEARN AND EXPERIENCE SCIENCE

FRIDAY 20TH JULY - SATURDAY 21ST JULY 2012

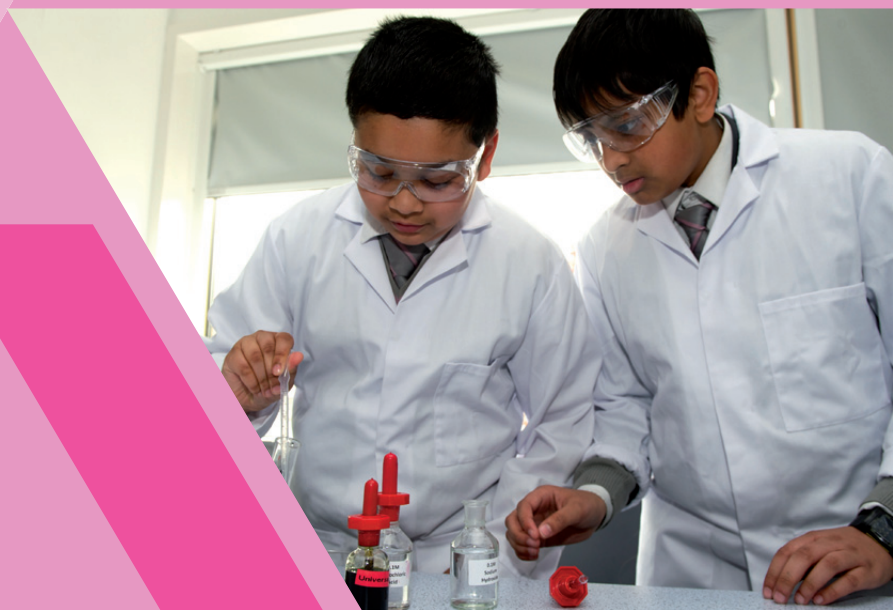
Welcome

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

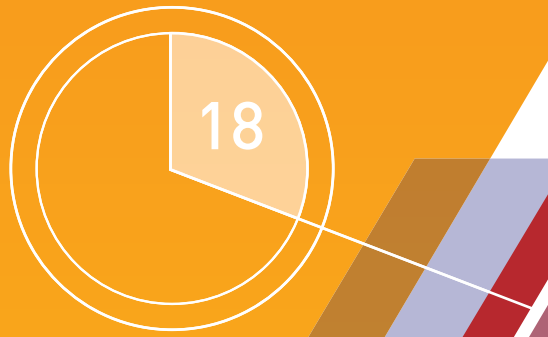
At St. Paul's Way Trust School, we are proud of our status as London's first Faraday specialist science school. We are committed to inspiring young people to take a life-long interest in science and encouraging the next generation of Britain's scientists through innovative teaching methods and a practical and investigative approach to learning.

This Science Summer School offers Year 11 and 12 students studying science at GCSE or A level the opportunity to learn from and interact with some of Britain's leading scientists through a programme of seminars, discussion and hands-on experiments. The Science Summer School will include presentations from experts in biology, chemistry and physics and will cover a broad range of topics and interests.

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



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.



PROGRAMME

FRIDAY 20TH JULY

13.00 Registration
13.45 Welcome and Introduction by Professor Brian Cox

Session One 14:00 – 15:30

14:00 **'Science and business'** Dr. Gordon Sanghera (Oxford - Chemistry)
14:18 **'The ethical frontiers of science'** Prof. Hagan Bayley (Oxford - Chemistry)
14:36 Q&A session and general discussion
14:50 Student presentation
14:55 Practical activity/demonstration

15:30-15:45 - Break

Session Two 15:45 – 17:15

15:45 Student presentation
15:50 **'The origin of complex life'** Dr. Nick Lane (UCL - Biology)
16:08 Practical activity/demonstration
16:35 **'How the nose knows'** Prof. Matthew Cobb (Manchester - Biology)
16:53 Q&A session and general discussion

Evening reception 19:00 – 21:00

Welcome - Grahame Price, Head Teacher
'East London - A great place to do science' Professor Paul Brickell, Executive Director of Regeneration & Community partnerships, London Legacy Development Corporation
'The human story behind a career in science' - Informal discussion with all speakers led by Professor Brian Cox

SATURDAY 21ST JULY

09.30 Registration
10:00 Welcome and Introduction by Professor Brian Cox

Session Three 10:10 – 10:45

10:10 **'CERN & the Large Hadron Collider – Latest news from the energy frontier'** Jon Butterworth (UCL - Physics)
10:28 Q&A session and general discussion

Session Four 10:45 – 12:00

10:45 **'Pushing scientific boundaries – Arctic style'** Pen Hadow
11:03 **'Life begins at -40°C'** Dr. Ceri Lewis (Exeter - Marine Biology)
11:21 Questions and general discussion
11:35 Practical activity/demonstration

12:00-13:00 - Lunch

Session Five 13:00 – 14:05

13:00 **'Exploring the Universe'** Prof. Brian Cox
13:18 Q&A session and general discussion
13:30 Practical activity/demonstration
14:00 Student presentation

14:05-14:20 - Break

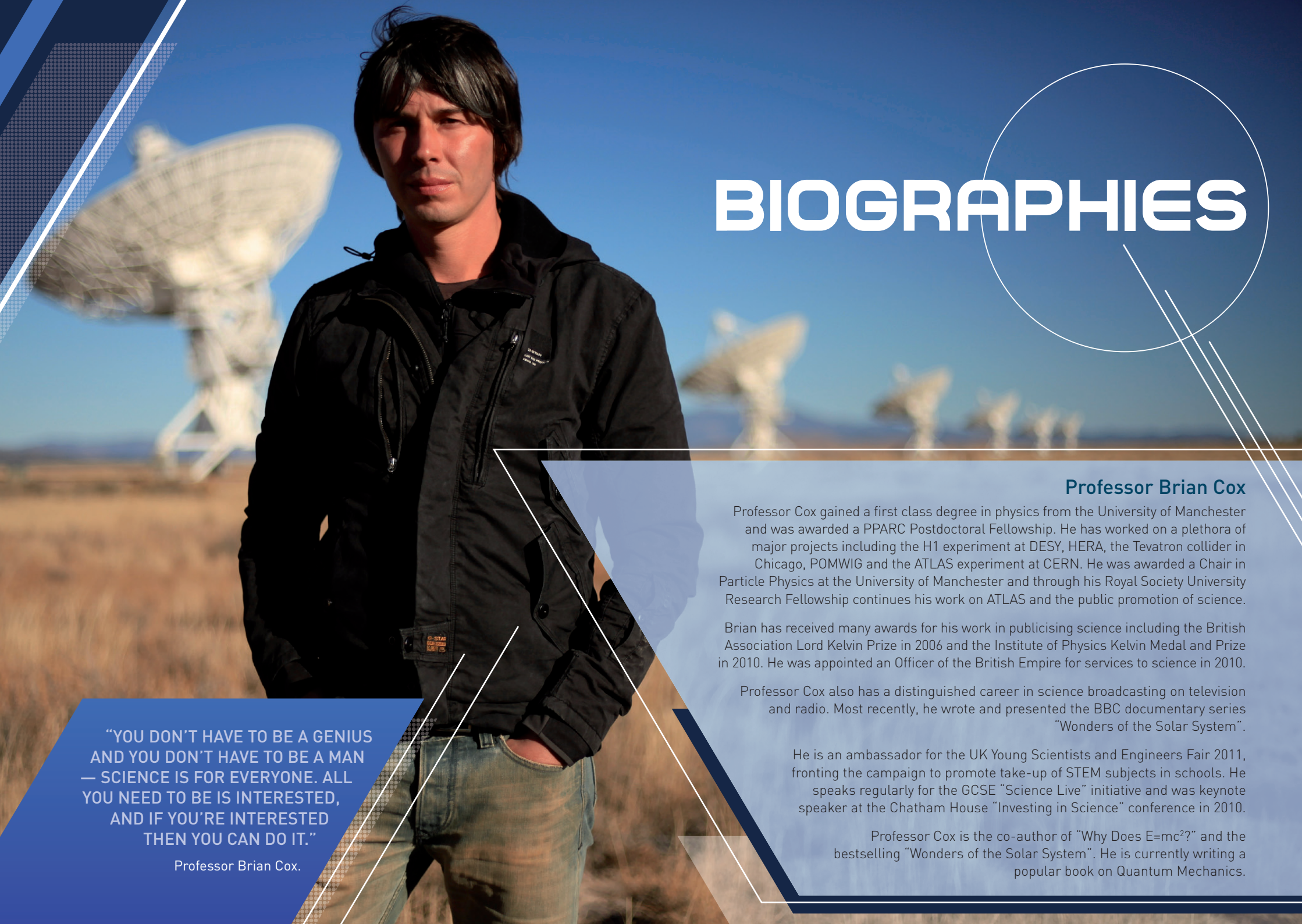
Session Six 14:20 -14:55

14:20 **'How can we predict the future of our planet?'** Dr. Tamsin Edwards (Bristol)
14:38 Q&A session and general discussion
14:50 Student presentation

14:55 **Panel discussion with speakers**
15:30 **Closing Remarks by Lord Mawson OBE**
15:45 **Close**

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.



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. Most recently, he wrote and presented the BBC documentary series "Wonders of the Solar System".

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". He is currently writing a popular book on Quantum Mechanics.

"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

Doctor Gordon Sanghera

Gordon has a DPhil in biosensor technology and a degree in Chemistry. He worked in Research and Development roles in the pharmaceutical industry, holding Director level positions at Abbott Laboratories in both the UK and US, before co-founding Oxford Nanopore, with Hagan Bayley and IP Group. He was appointed CEO in June 2005 and has particular expertise in the design and development of point-of-care biosensor devices.

Oxford Nanopore Technologies is developing the GridION system, a new generation of electronic molecular analysis system for use in scientific research, personalised medicine, crop science, security/defence and more. The platform technology uses nanopores to analyse single molecules including DNA/RNA and proteins.

Professor Hagan Bayley

Hagan Bayley received his B.A. in Chemistry from the University of Oxford, after which he worked under the supervision of Professor Jeremy Knowles at Harvard University, receiving a Ph.D. in Chemistry. Professor Bayley spent most of his academic career at leading US academic institutions, including Harvard, MIT, the University of Massachusetts and Texas A&M University. He returned to the UK in 2003 as the Professor of Chemical Biology in the Department of Chemistry at the University of Oxford and is a fellow of Hertford College. Oxford's Chemistry department is now the largest in the western world, and it has recently completed the construction of state-of-the-art facilities for multidisciplinary chemistry research.

Professor Hagan Bayley has a particular interest in the analysis of DNA at the single molecule level and the potential for ultra-fast gene sequencing using nanopores and in 2005 helped found Oxford Nanopore with Dr. Gordon Sanghera.

Doctor Nick Lane

Dr Nick Lane is a biochemist and writer in the Department of Genetics, Evolution and Environment at UCL. His research is on the origin and early evolution of life, and Nick is leading a research programme across UCL into the origins of life. Nick is particularly interested in the way that cells generate energy, and the extraordinary effects this has had on the evolution of life on Earth. He is the author of three acclaimed books on evolution, the last of which, Life Ascending, won the 2010 Royal Society Prize or Science Books. He is a popular lecturer and contributes regularly to magazines like Nature and New Scientist.

Professor Matthew Cobb

Professor Matthew Cobb studied Psychology at the University of Sheffield, and then went to London to investigate the behaviour of twins. He then travelled to France, where he worked for 18 years. It was while he was in France that he began to research the sense of smell, in a very unusual way: He studies the behaviour of maggots! In 2002 he decided to return to the UK. Although he enjoyed living and working in Paris, he found the research and university system to be too rigid. The UK provided exactly the kind of flexible funding system and encouragement of excellence amongst both students and researchers that he wanted. Over the last 10 years his research has flourished, and he has been able to collaborate with colleagues with a wide range of skills, in a way that would not have been possible in France.

BETWEEN 2008 AND 2014 THE UK WILL NEED 2.4 MILLION MORE PEOPLE WORKING IN SCIENCE AND TECHNOLOGY BASED JOBS.

Engineering UK Report 2011

BIOGRAPHIES

Professor Paul Brickell

Paul trained as a molecular biologist, set up and led a research group studying embryonic development and childhood leukaemia and was from 1995 to 2002 Professor of Molecular Hematology at the Institute of Child Health at Great Ormond Street Hospital, University College London, where he established a highly successful childhood cancer research department.

In 2002 Paul changed careers to contribute to the regeneration of his "home town" of east London; first as Director of Regeneration and Chief Executive of the Bromley by Bow Centre and then as Chief Executive of Leaside Regeneration, overseeing the delivery of new homes and physical infrastructure such as roads, workspaces, parks and facilities for health and social care. The involvement of local communities was central to this work and the programme provided many opportunities for local people to improve their skills, get jobs and develop small businesses.

Paul joined the Olympic Park Legacy Company as Executive Director of Regeneration and Community Partnerships in October 2011. The work to maximise the legacy for east London, and promote the physical, social, environmental and economic regeneration of the Olympic Park area continues under the London Legacy Development Corporation.

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.

THERE IS EXPECTED TO BE A 48% INCREASE IN DEMAND FOR PHYSICAL ENVIRONMENTAL SCIENCE GRADUATES IN THE NEXT EIGHT YEARS.

The Demand for STEM Graduates, CIHE 2009.

Pen Hadow

Pen rose to international fame when in 2003 he achieved his extraordinary goal to become the first person to trek solo, without resupply by third parties, from Canada to the North Geographic Pole – a feat which has not been repeated and thought comparable in difficulty to making the first ascent of Everest, solo and without oxygen. Within months he went on to become the only Briton to have trekked, without resupply, to both the North and South Poles.

Pen's exploration and entrepreneurial interests combined in 2009 to form Geo Mission, the pioneering environmental sponsorship organisation, which delivered the multi-award winning series of Catlin Arctic Surveys (2009-11) investigating the rates, causes and global impacts of the fast-disappearing Arctic sea ice, ocean acidification and thermohaline destabilisation.

Doctor Ceri Lewis

Dr. Ceri Lewis is a NERC Research Fellow and a marine biologist with a research focus on the environmental biology of marine invertebrates and their life history responses to environmental parameters such as climate change and pollution. Her research aims to further our understanding of how marine invertebrates adapt and survive in a changing and increasingly polluted marine environment, and the potential impacts of environmental change on their reproductive processes and life history evolution.

Ceri has been working on the Catlin Arctic Survey for the past two years to investigate climate change and the effects of carbon dioxide on the Arctic Ocean, on an ice base only 750 miles from the North Geographic Pole.

BIOGRAPHIES

Doctor Tamsin Edwards

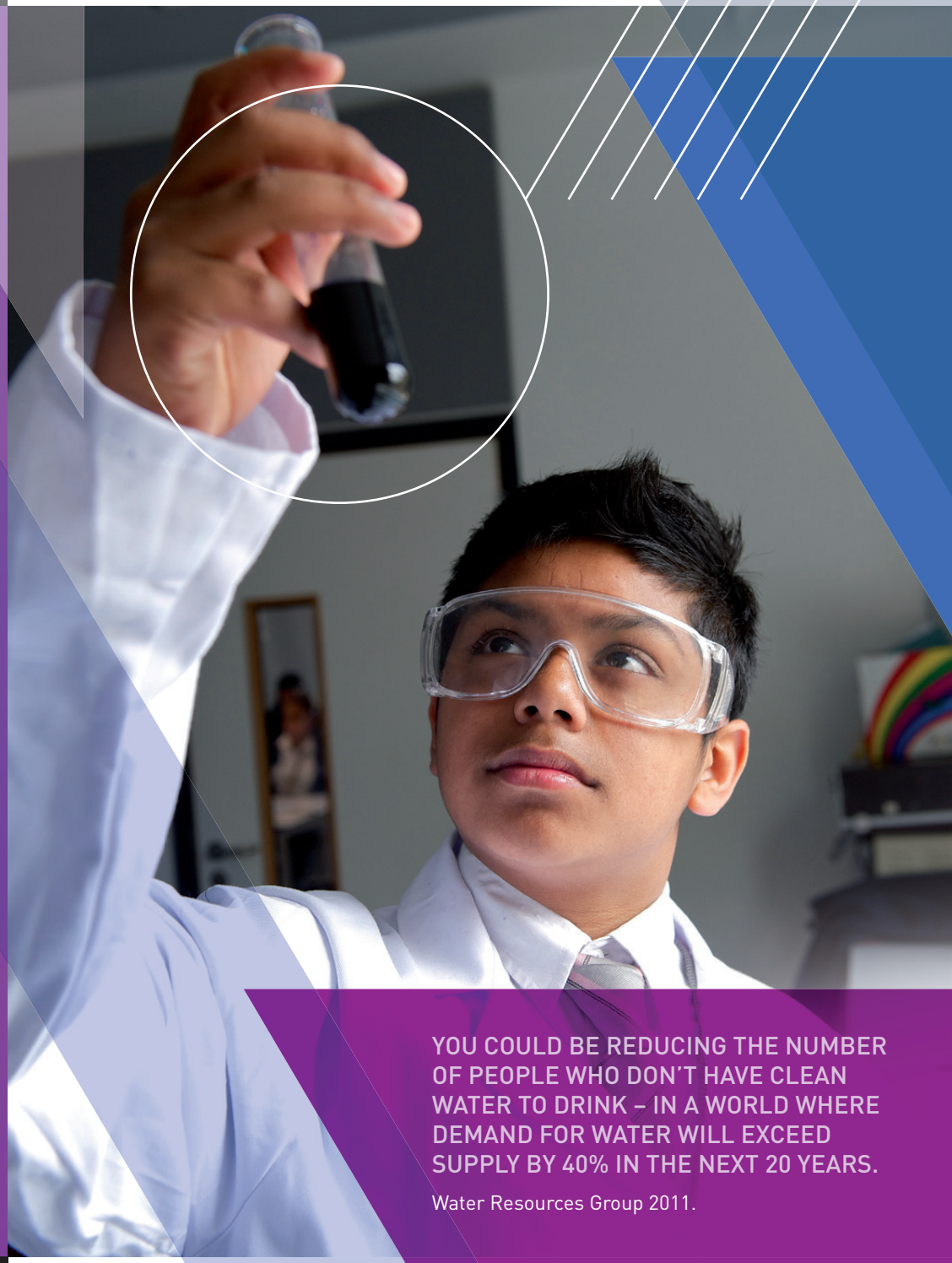
Tamsin is a climate scientist in the School of Geographical Sciences at the University of Bristol. She did an undergraduate degree in physics and a PhD in particle physics at the University of Manchester, then moved into climate science in 2006. Her research uses computer models to understand climate 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.

Lord Andrew Mawson

Andrew is a serial social entrepreneur, best known for his pioneering work as founder of the Bromley-by-Bow Centre in East London. He also co-founded Community Action Network (CAN). Recently he co-founded One Church 100 Uses CIC and launched the Water City Group to create and implement a vision for East London revitalized 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. 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 Olympic 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, creating a lasting legacy from the 2012 Games.

For the past 5 years, Andrew has directed the St. Paul's Way Transformation Project: this regeneration project has become a national pathfinder showcasing 'how to do successful regeneration'. The project includes a new health centre, 500 new homes and the £40 million St. Paul's Way Trust School.



YOU COULD BE REDUCING THE NUMBER OF PEOPLE WHO DON'T HAVE CLEAN WATER TO DRINK – IN A WORLD WHERE DEMAND FOR WATER WILL EXCEED SUPPLY BY 40% IN THE NEXT 20 YEARS.

Water Resources Group 2011.

St. Paul's Way Trust School is the **first Faraday Science School in London** and is leading the way in delivering an **innovative and engaging science** curriculum and providing access to **state-of-the-art facilities** for 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 Transformational Project in Tower Hamlets, the school has undergone a **£40 million rebuild** and is now fully equipped to **drive up standards in science** education and encourage our young people to study science at a higher level. **Professor Brian Cox** opened the school's new **Faraday Science Centre** on 16th June 2011.

Our Faraday status has allowed us to change how science and technology is taught in the school, by providing **fun, practical, project-based learning** opportunities and encouraging our students to develop a **lifelong interest in science**.

We are also keen to foster links between science, education and the local community so that science is seen as a vital part of the community's development. For example, we have developed a working relationship with the local health centre and we continue to be **proud of our partnerships** with **prestigious universities** who form part of the Trust. These partners are instrumental to the school's ongoing ambition to create an environment of excellence.

The Science Summer School is proudly supported by

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Underwriting Ambition

Andrew Mawson Partnerships

LONDON LEGACY DEVELOPMENT CORPORATION

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