global grand challenges summit
Exploring collaborative approaches to tackling global grand challenges

LDN
12-13 MAR 2013

Programme

LONDON, 12-13 MARCH 2013
global grand challenges summit

DATE: 12-13 MARCH 2013
VENUE: IET LONDON: 2 SAVOY PLACE, LONDON WC2R OBL

The organisers would like to thank the following delegate sponsors for their support:
ABB, Arup, EADS, Foster Wheeler, GlaxoSmithKline, IBM, Jaguar Land Rover, Heathrow Airport Limited, Oxford Instruments, Petrofac, Qinetiq and Renishaw.

welcome 2
From the Chair of the Global Grand Challenges Summit steering group: Dame Ann Dowling

agenda 4
plenary speakers 9
academy hosts 10
sustainability 12
health 15
education 18
enriching life 21
technology and growth 24
resilience 27
next steps panel 30
short film competition 32
organisers 34
notes 37
venue map 41
From the Chair of the Global Grand Challenges Summit steering group

Dame Ann Dowling

As Chair of the international steering group, I would like to extend a warm welcome to you to the first Global Grand Challenges Summit.

The Summit – jointly organised by the UK, US and Chinese national academies of engineering – will see nearly 500 engineering thought leaders and future leaders from all three countries come together to discuss how engineering can contribute to solving the complex problems that will delimit humanity’s progress over the next century.

I am extremely impressed by the quality of high level speakers at this summit: including Bill Gates, Craig Venter, Robert Langer, Frances Arnold, Lord Darzi, Jo da Silva, Jeffrey Sachs and Regina Dugan, among many others. And I am delighted that these names have been complemented by a gallery of rising stars, including some of the leading Chinese engineers of their generation.

But this event is not about elite engineers from the UK, US and China talking amongst themselves. This is about the global engineering community coming together to radically rethink the way it innovates, educates and collaborates in order to better prepare for the complex challenges it will be called upon to address.

Our inspiration has been a 2008 US National Academy of Engineering report, Engineering Grand Challenges for the 21st Century. For this project, the NAE brought together a group of senior international researchers, businesspeople and policymakers to identify 14 engineering grand challenges that would drive the global research agenda in the 21st century.

I would like to see these challenges as a provocation, which we can use to untangle some fundamental issues about the place of engineering in the world. To what extent can an engineering systems approach inform international collaboration on grand challenges style projects? And how should we change the ways engineers interface with each other, and with different disciplines, policymakers, and publics, to make these projects a success?

Much hard work and support has brought us to this point. On behalf of the three organising academies, I would particularly like to thank our partners: Lockheed Martin, the UK’s Engineering and Physical Sciences Research Council (EPSRC) and the IET. Microsoft has sponsored a Student day, and many universities and businesses on both sides of the Atlantic have supported the attendance costs of younger attendees. I would also like to credit the excellent work of my fellow steering group members, including Dean Thomas Katsouleas of Duke University, Dean Richard Miller of Olin University, Dean Yannis Yortsos of USC, and Tony Hey, Vice President of Microsoft Research, in helping to organise this event. Finally, I would like to give particular thanks to the Academy staff who have worked tirelessly over many months to ensure the success of this Summit.

This will be the start of a long conversation. But already there are encouraging signs that our Summit will have a broader impact on the role of engineering in today’s complex world. I hope that the discussions you participate in today will give you the ideas, connections and enthusiasm to take the next steps on this necessary and exciting journey.

This is about the global engineering community coming together to radically rethink the way it innovates, educates and collaborates in order to better prepare for the complex challenges it will be called upon to address.
Tuesday 12 March

8.00am Registration and welcome reception

9.00am WELCOME
Welcome by Chair – Professor Dame Ann Dowling
Head of the Department of Engineering, University of Cambridge

9.10am Welcome Address by Sir John Parker, President, the Royal Academy of Engineering, with responses from Professor CD Mote Jr, Officer and President-nominee, US National Academy of Engineering (NAE) and Dr Jian Song, Honorary Chairman, Governing Board of the Chinese Academy of Engineering (CAE)

9.25am PLENARY ADDRESS
Address by Dr J Craig Venter, Founder, the J. Craig Venter Institute
20 minutes speaking followed by Q&A

10.10am Break

10.50am SUSTAINABILITY

Keynote speaker
Professor Jeffrey Sachs, Director, The Earth Institute,
Columbia University

Professor Angela Belcher, Professor of Energy in Materials Science and Engineering and Biological Engineering, MIT

John Loughhead, Executive Director, UK Energy Research Centre

Allard Castelein, Vice President Environment, Shell

Professor Calestous Juma, Professor of the Practice of International Development, Harvard Kennedy School, Harvard University

12.20pm UK and US short film competitions - screening of runner-up films

12.30pm Lunch

1.50pm HEALTH

Keynote speaker
Dr Robert Langer, David H. Koch Institute Professor, MIT

Dr Frances Arnold, Professor of Chemical Engineering, Bioengineering and Biochemistry, Caltech

Professor Ara Darzi, Professor of Surgery, Imperial College London

Dr Rebecca Richards-Kortum, Director, Rice 360° Institute for Global Health Technology

Dr Qimin Zhan, Vice President, Chinese Academy of Medical Sciences

3.15pm UK and US short film competitions - winning film screenings and trophy presentations

3.25pm Break

4.00pm EDUCATION

Keynote speaker
Professor John L Hennessy, President, Stanford University

Professor Dame Ann Dowling, Head of the Department of Engineering, University of Cambridge

Dean Kamen, Founder, FIRST

Robert H Matheson III, Principal, Wake NC State University STEM Early College High School

Professor Chris Wise, Co-founder, Expedition Engineering, and Professor of Civil Engineering Design, University College London

5.30pm Address by the Rt. Hon. David Willetts MP, Minister for Universities and Science

5.45pm Reception for all
**Wednesday 13 March**

8.00am  Welcome reception

9.00am  Introduction

9.05am  **ENRICHING LIFE**

  Keynote speaker  
  **Professor Neil Gershenfeld**, Director, Centre for Bits and Atoms, MIT
  **Dr Eric Brown**, Director of Watson Technologies, IBM Research
  **Alexandra Daisy Ginsberg**, Design Fellow on Synthetic Aesthetics, Stanford University and University of Edinburgh
  **Professor Helen Storey**, Co-founder, Catalytic Clothing, and Professor of Fashion and Science, University of the Arts London (LCF at Centre for Sustainable Fashion)

10.30am  Break

11.00am  **TECHNOLOGY AND GROWTH**

  Keynote speaker  
  **Dr Mike Lynch**, Founder, Invoke Capital
  **Dr Margaret Anne Craig**, Chief Executive Officer, Clyde Biosciences
  **Dr Regina E Dugan**, Senior Vice President, Advanced Technology and Projects (ATAP), Motorola Mobility
  **Professor Andy Hopper**, President, the IET, and Head of the Computer Laboratory, University of Cambridge
  **Dr Margaret Anne Craig**, Chief Executive Officer, Clyde Biosciences
  **Dr Margaret Anne Craig**, Chief Executive Officer, Clyde Biosciences
  **Dr Margaret Anne Craig**, Chief Executive Officer, Clyde Biosciences
  **Dr Margaret Anne Craig**, Chief Executive Officer, Clyde Biosciences

12.20pm  Presentation from the Grand Challenges Student Day

12.30pm  Lunch

1.50pm  **RESILIENCE**

  Keynote speaker  
  **Jo da Silva**, Director of International Development, Arup
  **Bran Ferren**, Co-founder and Chief Creative Officer, Applied Minds
  **Dr Paul Golby**, Chair, the Engineering and Physical Sciences Research Council and Non-executive Director, National Grid
  **Professor Robert Mair**, Head of Civil and Environmental Engineering, University of Cambridge
  **Dr Jianyun Zhang**, President, Nanjing Hydraulic Research Institute

3.10pm  Break

3.45pm  **PLENARY ADDRESS**

  Address and Q&A from **Bill Gates**, Co-chair and Trustee, Bill and Melinda Gates Foundation (by video link)

4.30pm  **NEXT STEPS**

  Final discussion, led by a panel of rising stars in engineering and intersecting fields, on how the grand challenges agenda can be used to drive change in the future

5.30pm  Ends
The prosperity of future generations relies on unprecedented levels of inter-disciplinary and international co-operation in pursuit of solutions to global challenges. Whether the task be providing clean water for a soaring global population, or developing the resilience of our infrastructure to climate change, solutions demand more than isolated efforts. Instead, it is time to explore what could be accomplished with a globally-integrated systems approach.

**Bill Gates**

Bill Gates is co-chair of the Bill & Melinda Gates Foundation. In 1975, Bill Gates founded Microsoft with Paul Allen, and led the company to become the worldwide leader in business and personal software and services. In 2008, Bill transitioned to Chairman of Microsoft to focus full-time on his foundation’s work to expand opportunity to the world’s most disadvantaged people.

Along with co-chair Melinda Gates, he leads the foundation’s development of strategies and sets the overall direction of the organisation. In 2010, Bill, Melinda and Warren Buffett founded the Giving Pledge, an effort to encourage the wealthiest American families and individuals to publicly commit more than half of their wealth to philanthropic causes and charitable organisations during their lifetime or in their will.

**J Craig Venter**

Dr J Craig Venter is a biologist renowned for his contributions in sequencing the first draft human genome in 2001, the first complete diploid human genome in 2007 and construction of the first synthetic bacterial cell in 2010. He is founder, chairman and CEO of the J Craig Venter Institute (JCVI) and founder and CEO of the company Synthetic Genomics Inc (SGI).

Craig and his teams are focused on a variety of projects and programs including: synthetic genomic research and the application of these advances to develop new biofuels, vaccines and food and nutritional products; continued analysis of the human genome including the human microbiome; and discovering and understanding genetic diversity in the world’s oceans. He is a recipient of the 2008 National Medal of Science, a member of the National Academy of Sciences and the author of A Life Decoded: My Genome: My Life (2007).
Dan Mote received the Founders Award of the National Academy of Engineering and the American Society of Mechanical Engineers (ASME) Medal in recognition of his work providing results of great practical importance in the vibration and stability of rotating and translating flexible structures, in the biomechanics of snow skiing injury and also for academic leadership.

He serves on the National Research Council Governing Board, the National Academy of Engineering Council as an officer and co-chairs the Academies Government-University-Industry Research Roundtable. He served as president of the University of Maryland for 12 years and on the University of California, Berkeley faculty for 31 years. He was awarded the Humboldt Prize by the Federal Republic of Germany; Fellowship of the American Academy of Arts and Sciences; Honorary Fellowship of ASME; the University of California, Berkeley Distinguished Teaching Award and its Distinguished Engineering Alumnus Award.

Dr Jian Song is Honorary Chairman of the Governing Board of the Chinese Academy of Engineering, and Chairman of the All-China Environment Federation. He has made tremendous achievements in the fields of control theory, guided missile and aerospace technology, and population control theory. He made significant contributions to the development of S&T and environmental protection in China and he proposed Nation Building through Technology and Education, which is now one of three key national development strategies.

Song’s previous positions include the Vice-Minister and Chief Engineer-Scientist of the Ministry of Astronautics, Chairman of the State Science and Technology Commission, President of Chinese Academy of Engineering, and First Vice-Chairman of Committee on Academic Degrees of China’s State Council.

His academic titles include Academician of the Chinese Academy of Sciences and the Chinese Academy of Engineering; Honorary Professor of the Academy of Mathematics and System Sciences, and the Chinese Academy of Sciences; Foreign Associate of the US National Academy of Engineering; Foreign Member of Royal Swedish Academy of Engineering Sciences; and Member of the International Astronautic Academy.

Honors and awards conferred to Song including: the highest National Award for Scientific and Technological Progress for his achievements in population control study; the Albert Einstein Award; China’s National Natural Science Prize; and the HLHL Award.

Jim Al-Khalili is a professor of physics, author and broadcaster based at the University of Surrey where he currently teaches and also holds a chair in public engagement in science. He received his PhD in nuclear physics in 1989 and remains active in research in theoretical physics. He is active as a science communicator and has written a number of popular science and history of science books, between them translated into over twenty languages. His latest is Paradox: The Nine Greatest Enigmas in Physics.

Jim is a regular presenter of TV science documentaries, including the Bafta nominated Chemistry: A Volatile History and, most recently, Shock and Awe: The Story of Electricity and Order and Disorder, both for BBC4. He also presents the weekly BBC Electricitiy and Order and Disorder, both for BBC4. He also presents the weekly BBC Radio 4 programme, The Life Scientific. He provides expert advice for bodies such as the Royal Society, the British Council and the Department for Education. He is also active in public life and is a strong advocate for rationalism and secularism and has recently taken over as president of the British Humanist Association. He is a recipient of the Royal Society Michael Faraday medal and the Institute of Physics Kelvin Medal. He was appointed Officer of the Order of the British Empire in 2008.
Climate change and the impact of population growth on resources are among the greatest risks to mankind’s existence, yet efforts to mitigate these risks have been partial and haphazard. There is still no consensus on how sustainable development can be reconciled with strong growth in emerging and developing economies that is lifting billions out of poverty. This session asks whether a global systems approach to engineering innovation can bolster political efforts to reconcile economic growth with environmental sustainability. It brings together senior speakers who are deeply engaged in promoting sustainable futures: from encouraging sustainable growth in the developing world to investigating revolutionary future energy technologies; from reducing the carbon footprint of a major energy company, to demonstrating how small lifestyle changes can have massive environmental impacts.

There is still no consensus on how sustainable development can be reconciled with the strong growth in emerging and developing economies that is lifting billions out of poverty.
John Loughhead is Executive Director of the UK Energy Research Centre, a distributed organisation drawing together 150 academic researchers and some 30 universities which is the focal point of the UK energy research programme. He was previously Vice-President of the Alstom group.

He has been active in energy systems research for over 30 years, developing new generation, conversion and system technologies, and has extensive interactions with UK and international government bodies on energy policy development and new technology deployment. He has recently been appointed the UK-China Science Focal Point for Energy and Renewables.

John is a graduate in Mechanical Engineering from Imperial College, London, where he also spent five years in computational fluid dynamics research. He is Past-President of the UK's Institution of Engineering and Technology, Fellow of the UK and Australian national academies of engineering, Professor of Engineering at Cardiff University and Fellow of Queen Mary University of London.

Calestous Juma

Professor Calestous Juma is an internationally recognized authority on the application of science and technology to sustainable development. He is Professor of the Practice of International Development and Director of the Science, Technology, and Globalization Project at Harvard’s Kennedy School. He directs the school’s Agricultural Innovation in Africa Project, funded by the Bill and Melinda Gates Foundation.

Calestous sits on the selection jury of the Queen Elizabeth Prize for Engineering and co-chairs the African Union’s High Level Panel on Science, Technology and Innovation. After receiving his DPhil in science and technology policy studies in the UK, he founded the African Centre for Technology Studies in Nairobi, the continent’s first independent think tank on innovation. He is a former executive director of the UN Convention on Biological Diversity, former Chancellor of the University of Guyana and has been a member of the governing boards of leading international organisations working on sustainable development.

A Kenyan national, Calestous has been elected to several prestigious academies including the Royal Society of London, the US National Academy of Sciences, the Academy of Sciences for the Developing World (TWAS), the UK Royal Academy of Engineering and the African Academy of Sciences. He has received numerous international awards and honorary degrees.

Jeffrey Sachs

Professor Jeffrey Sachs is a world-renowned professor of economics, leader in sustainable development, senior UN advisor, bestselling author, and syndicated columnist whose monthly newspaper columns appear in more than 60 countries.

Jeffrey serves as the Director of The Earth Institute, Quetelet Professor of Sustainable Development, and Professor of Health Policy and Management at Columbia University. He is Special Advisor to United Nations Secretary-General Ban Ki-moon on the Millennium Development Goals, having held the same position under former UN Secretary-General Kofi Annan. He is co-founder and Chief Strategist of Millennium Promise Alliance, and is Director of the Millennium Villages Project. He is also Director of the UN Sustainable Development Solutions Network. He has authored three New York Times bestsellers in the past seven years: The End of Poverty (2005), Common Wealth: Economics for a Crowded Planet (2008), and The Price of Civilization (2011).

Mathematical models can predict the outcomes of complex biological systems over time, allowing researchers to understand how these systems might respond to different interventions and environmental changes. These models can help identify potential targets for intervention and design effective strategies to manage the affected populations.
Frances Arnold

Dr. Frances Arnold is the Dick and Barbara Dickinson Professor of Chemical Engineering, Bioengineering and Biochemistry at the California Institute of Technology (Caltech). Her research focuses on directed evolution of enzymes and biosynthetic pathways, with applications to alternative energy, chemicals, and medicine. Frances received her bachelor’s degree in mechanical and aerospace engineering from Princeton University in 1979.

Frances was awarded a doctorate in chemical engineering at the University of California-Berkeley. After postdoctoral work, she joined the Caltech faculty. She has received numerous honours and awards, including the US National Medal of Technology and Innovation and the Charles Stark Draper Prize of the US National Academy of Engineering. She is the only woman to be elected to membership in all three US national academies: the Institute of Medicine, the National Academy of Engineering, and the National Academy of Sciences.

An Advisory Board member of the Joint BioEnergy Institute and the Packard Fellowships in Science and Engineering, Frances also serves on the President’s Advisory Council at KAUST and is a judge for The Queen Elizabeth Prize for Engineering. Frances has served on the science advisory boards of numerous companies, including Geno, Inc., which she co-founded in 2005. She has co-authored over 200 publications and is co-inventor on 36 US patents.

Robert Langer

Professor Robert Langer is the Institute Professor at Massachusetts Institute of Technology (MIT). Being an Institute Professor is the highest honour that can be awarded to a faculty member. He has written over 1,170 articles and has nearly 800 issued or pending patents.

Robert has received over 170 major awards including the US National Medal of Science, the Millennium Technology Prize, the Charles Stark Draper Prize, the Albany Medical Center Prize and the Lemelson-MIT prize, for being “one of history’s most prolific inventors in medicine.” He is one of the few individuals ever elected to all three US national academies: the Institute of Medicine, the National Academy of Engineering, and the National Academy of Sciences.

Forbes Magazine selected Robert as one of the 15 innovators worldwide who will reinvent our future. Time Magazine and CNN named him as one of the 100 most important people in America and one of the 18 top people in science or medicine in America (America’s Best).

Robert has received honorary doctorates from Harvard University, the Mt. Sinai School of Medicine, Yale University, and the ETH (Switzerland) among numerous others. He received his Bachelor’s Degree from Cornell University in 1970 and his Sc.D. from MIT in 1974, both in Chemical Engineering.

Rebecca Richards-Kortum

Rebecca Richards-Kortum is Stanley C. Moore Professor of Bioengineering and Chair of Bioengineering at Rice University. She is a member of the US National Academy of Engineering, the American Institute for Medical and Biological Engineering, the American Association for the Advancement of Science, and the Biomedical Engineering Society. She has won numerous awards for her teaching and research.

Rebecca’s lab develops inexpensive, portable optical imaging systems that provide point-of-care diagnosis for cancer, pre-cancer, and infectious disease in low-resource settings. These technologies have been applied in the US, Botswana, Brazil, China, India, Mexico, and Taiwan.

In 2006, Rebecca founded the HHMI-supported program Beyond Traditional Borders (BTB), a minor in global health technologies that has engaged more than 10% of Rice’s undergraduates. Students have designed more than 50 technologies that have been used by physicians in 19 countries in Africa, Latin America, and the Caribbean. BTB won the Science Prize for Inquiry-Based Instruction in 2012.

Qimin Zhan

Dr. Qimin Zhan is Vice President of Chinese Academy of Medical Sciences and Director of the State Key Laboratory of Molecular Oncology. He trained at Suzhou University Medical College and the Peking Union Medical College and obtained postdoctoral experience at the University of California, University of Texas, Southwestern Medical Centre at Dallas and the National Cancer Institute of National Institutes of Health, and was a tenured faculty member in the University of Pittsburgh School of Medicine.

He is currently a Professor at Peking Union Medical College and a Senior Investigator in Chinese Academy of Medical Sciences Cancer Institute. Zhan is Chairman of the National Advisory Board for 863 High-Tech plan in biomedical sciences and Chief Scientist of the 973 National Fundamental Program (cancer field). His research focus is the molecular pathways involved in controlling cell cycle checkpoint and apoptosis after DNA damage. He is also interested in signalling pathways involved in regulation of the maintenance of genomic stability and tumor metastasis. His research has attracted multiple grants. He has published over 130 peer-reviewed SCI papers in prestigious journals, including Cell, Curr. Med. Res. and Pract. and Science, and these are highly cited in the biomedical field.

...these new technologies and related advances in data and information technology can be mobilised and built on in the coming decades to enhance the quality of care available in our clinics and hospitals...
If we are to meet our global challenges, we need to educate a new generation of engineers who are more representative of our society, and have a portfolio of skills and attributes which go beyond traditional engineering curricula. To meet these needs, pioneering schools, universities and charities are re-examining some of the fundamental concepts of engineering education: including cherished notions of what a discipline consists of, what a university looks like, and what an engineer does. A panel of engineering education stakeholders will offer insights from their own experiences, and debate the risks and rewards of the upcoming revolution in engineering education.

Dame Ann Dowling

Dame Ann Dowling is Head of the Department of Engineering at the University of Cambridge where she is Professor of Mechanical Engineering and Chairman of the University Gas Turbine Partnership with Rolls-Royce. She has held visiting posts at MIT (Jerome C Hunsaker Visiting Professor, 1999) and at Caltech (Moore Distinguished Scholar, 2001). Her research is primarily in the fields of combustion, acoustics and vibration and is aimed at low-emission combustion and quiet vehicles. She is one of the founders of the Energy Efficient Cities initiative in Cambridge and was the UK lead of the Silent Aircraft Initiative, a collaboration between researchers at Cambridge and MIT.

Ann Dowling is a Fellow of the Royal Society and the Royal Academy of Engineering and is a Foreign Member of the US National Academy of Engineering and of the French Academy of Sciences. She has an Honorary ScD degree from Trinity College Dublin. Ann has served on a number of industry and government advisory committees and is a non-executive director of BP plc. She was appointed DBE by the Queen for services to mechanical engineering in 2002, and DBE for services to science in 2007.

John L Hennessy

Professor John L Hennessy joined Stanford's faculty in 1977 and rose to full professorship in 1986. From 1983 to 1993, John was director of the Computer Systems Laboratory for research in computer systems design. He was chair of computer science from 1994 to 1996 and then became dean of the School of Engineering. As dean, he launched a five-year plan that laid the groundwork for new activities in bioengineering and biomedical engineering. In 1999, he became provost, and in 2000, became Stanford’s 10th president.

A pioneer in computer architecture, in 1981 John drew together researchers to focus on a computer architecture known as RISC (Reduced Instruction Set Computer). In 1984, he co-founded MIPS Computer Systems, now MIPS Technologies, which designs microprocessors. In recent years, his research has focused on the architecture of high-performance computers.

John is a recipient of numerous awards including a 2004 NEC C&C Prize for lifetime achievement in computer science and engineering, and the 2012 IEEE Medal of Honor. He is a member of the National Academy of Engineering and the National Academy of Sciences, and a fellow of the American Academy of Arts and Sciences, the Association for Computing Machinery, and the Institute of Electrical and Electronics Engineers.

Dean Kamen

Dean Kamen is the founder and president of DEKA Research & Development Corporation. Examples of technologies developed by DEKA include the HomeChoice™ portable dialysis machine, the IBOT™ Mobility System, the Segway™ Human Transporter, a DARPA-funded robotic arm, a new and improved Stirling engine, and the Slingshot water purifier.

Kamen has received many awards for his efforts, including the National Medal of Technology in 2000 and the Lemelson-MIT Prize in 2002. He was inducted into the National Inventors Hall of Fame in 2005 and has been a member of the National Academy of Engineering since 1997.

Among Kamen’s proudest accomplishments is founding FIRST (For Inspiration and Recognition of Science and Technology), an organization dedicated to motivating the next generation to understand, use and enjoy science and technology.
Advances in information and communication technology have changed the ways we work, play and create in ways that were almost inconceivable 20 years ago. Researchers working at the interface between engineering and the creative arts are investigating other technologies which might have an equally radical impact on our lives. This session looks at emerging technologies – from 3D printing, to artificial intelligence, to synthetic biology, to clothing that cleans the air – and asks how they might enhance the art we make, the stories we tell, the ways we interact with each other, and the ways we understand ourselves.

...we need to educate a new generation of engineers who are more representative of our society, and have a portfolio of skills and attributes which go beyond traditional engineering curricula.

Robert Matheson became Principal of the new Wake North Carolina State University STEM Early College High School (STEM ECHS) in November 2010. The STEM ECHS, located on NC State University’s campus in Raleigh, NC, opened in August 2011 with an initial cohort of 55 ninth grade students. After a successful first year, the STEM ECHS added another 55 students.

From 2005-2010 Robert was the Assistant Principal for Instruction at Apex High School (AHS). Before returning to AHS in 2004 as the Intervention Coordinator, he was Director and a founding board member at Kestrel Heights School (public charter school, grades 6-10). Robert worked at AHS from 1991-98 as a biology teacher, and also served as chairman of both the Science Department and School Improvement Team.

Robert’s experience prior to 1991 includes serving as: coordinator of a state-wide biotechnology education project for teachers; biology teacher at Broughton HS (Raleigh, NC); a seventh grade life science teacher at Ravenscroft School (Raleigh, NC); and fisheries biologist at the Duke University Marine Laboratory and National Marine Fisheries Service Laboratory in Beaufort, NC.

Robert received his B.S. and M.S. degrees in Zoology from North Carolina State University, and a Master of School Administration degree from North Carolina Central University.

Professor Chris Wise began his career with Ove Arup and Partners, where he became Arup’s youngest Director in 1992. In 1999, he left Arup to co-found Expedition. Chris is widely known for hands-on engineering projects, both as design lead and also in close working collaboration with some of the world’s leading architects, including Richard Rogers, Renzo Piano, Michael Hopkins and Norman Foster.

Chris is a Fellow of the Royal Academy of Engineering, and a recipient of their prestigious individual honour, the Silver Medal. He is also a Past Master of the Royal Designers of Industry, as well as a Trustee of the Design Council. He writes and broadcasts on the theme of creative design in projects, and lectures widely to engineering and architectural students in the UK and abroad.

Chris is currently a Professor of Civil Engineering Design at University College London and was recently awarded Gold Medal awards by both the Institute of Civil Engineers (ICE) and Institution of Structural Engineers (IStructE).

“...we need to educate a new generation of engineers who are more representative of our society, and have a portfolio of skills and attributes which go beyond traditional engineering curricula.”
Advances in information and communication technology have changed the ways we work, play and create in ways that were almost inconceivable 20 years ago.

This session looks at emerging technologies – from 3D printing, to artificial intelligence, to synthetic biology, to clothing that cleans the air...
Across the world, governments are intent on promoting growth through innovation. But there is still much to learn about how best to encourage innovation. How do we ensure that the best research results in innovative products and services? How can the state support innovation and ensure the integrity of vibrant entrepreneurial activities? And is the pursuit of economic growth really sustainable in the long term, or should we focus business and research efforts on enhancing the quality of life? Is this a false choice? This session brings together world renowned business people and thinkers to debate the issues surrounding innovation and growth.

Margaret Anne Craig graduated with a degree in Immunology/Pharmacology from the University of Strathclyde and went on to carry out a MSc and PhD at the University of Glasgow in the field of pathophysiology of cancer. She then took up a position as research associate at the University of Glasgow where she was involved in the development of biological assays and novel discovery platforms as well as cardiovascular physiology research.

Margaret Anne was awarded a BBSRC/RSE enterprise fellowship in 2011 which allowed her to spend one year developing her group’s technologies, exploring the market potential and carrying out business training. During the course of the year, it became apparent that her group’s technology had much commercial potential and they formed the spin-out company Clyde Biosciences. Last year Margaret won the Royal Academy of Engineering Entrepreneur of the year 2012 which has raised the profile of the company significantly. Subsequently, Clyde Biosciences has been shortlisted by the Times Higher Education awards for Outstanding Contribution to Technology and Innovation and by Scottish Enterprise as Innovators of the Year 2013. In her position as Chief Executive Officer, Margaret will play a major role in shaping Clyde Biosciences into a world-leading CRO company.

Dr Regina Dugan is Senior Vice President of the Advanced Technology and Projects for Motorola Mobility. She is responsible for building and leading the skunkworks-inspired team delivering breakthrough innovations.

Regina was most recently the Director of the US Defense Advanced Research Projects Agency (DARPA). She first served at DARPA as a program manager from 1996 to 2000, where she was named DARPA PM of the year in 1999, and was awarded the prestigious Bronze deFleury medal by the Army Engineer Regiment in 2000.

Prior to her appointment as Director of DARPA, Regina co-founded a niche investment firm, where she served as President and CEO; she has served as founder and senior executive in several commercial companies with diverse products.

Widely recognized for her leadership in innovation and technology development, Regina has been featured in The New York Times, The Wall Street Journal, Forbes, and Science News, among others. She obtained her doctoral degree in mechanical engineering from the California Institute of Technology and her master’s and bachelor’s degrees from Virginia Tech. She is co-author of Engineering Thermodynamics (1996), and a sole inventor or co-inventor on multiple patents and patents pending.

Andy Hopper is Professor of Computer Technology and heads up the Computer Laboratory at the University of Cambridge. With a long history of turning innovative research and technology into commercial success, he has co-founded a dozen start-ups, three of which have floated on stock markets. He is also Chairman of RealVNC, and Ubisense, both borne out of research by Cambridge University graduates and both winners of two Queen’s Awards for Innovation and International Trade. This achievement reflects Andy’s unique ability to successfully bridge the gap between academia and industry.

Andy is President of the Institution of Engineering and Technology, a Fellow of the Royal Academy of Engineering and the Royal Society, and in 2007 was made a Commander of the Order of the British Empire (CBE) for services to the computer industry. His current research interests include computer networking, pervasive and sensor-driven computing and using computers to ensure the sustainability of the planet.

Born in Warsaw, Poland in 1953 and a UK citizen since 1964, Andy received a BSc degree from the University of Wales Swansea and a PhD from the University of Cambridge.
New technologies provide better ways of predicting, preventing and responding to natural disasters and preparing ourselves for future extreme events, terror strikes, pandemics and climate shocks. But they also bring new dependencies and new threats. In this session, five senior speakers will discuss the latest engineering research and practice on disaster relief, flood prevention, cybersecurity, and energy security; they will also look at ways that concepts of resilience and risk can be better incorporated into the development of new infrastructures and technologies.

Dr Li Yingtao holds a doctorate degree from Harbin Institute of Technology. Yingtao joined Huawei in 1997 and has served as Chief of the Sweden Research Centre, Director of the Product Management Department of Wireless Marketing, Director of the Research Department of Products and Solutions and Director of the General Technology Office of Products and Solutions. He has also been President of the Central Research & Development Unit, President of the 2012 Laboratories, Director of the Integrated Technology Management Team, a member of the Human Resources Committee, and a member of the Strategy and Development Committee.

Alongside his entrepreneurial career, Mike has a number of board seats and advisory roles. He is a non-executive director of the British Library and Cambridge Enterprise and a council member of the Royal Academy of Engineering and of the Foundation for Science and Technology. He is a member of the advisory board of Tech City’s Investment Committee, an advisor to the Prince’s Trust technology group and a founding investor of Bridges Venturing.

During his career, Mike has received many awards and accolades including induction into the Digital Hall of Fame in 2012 and receiving the Outstanding Contribution award in the UKIT Industry awards.

Andrew Simms is the author of several books including Ecological Debt and the bestselling Tescopoly. He is a Fellow of nef (the new economics foundation) where he was policy director for many years, trained at the London School of Economics and was described by New Scientist magazine as, ‘a master at joined-up progressive thinking’. He is also one of the UK’s leading campaigners who co-authored the groundbreaking Green New Deal, and devised how to mark the day in the year when the world enters ‘ecological debt’. He also coined the term ‘Clone Towns’ in work pioneering new ways to revive local economies and recently proposed the idea of ‘National Gardening Leave’, combining a shorter working week with urban greening. He has witnessed first hand for more than twenty years failed international efforts to solve critical economic and environmental problems, from extreme poverty to climate change. His new book Cancel the Apocalypse: the New Path to Prosperity, newly published by Little Brown in 2013, is the result of his search for something better.

Mike Lynch is founder of Invoke Capital. He has long been regarded as a visionary figure within the technology world, described by the Financial Times as “the doyen of European software”. He advises the Prime Minister on science policy matters through the Council on Science and Technology. Mike founded Autonomy in 1996, the UK’s largest and fastest-growing software company, and was its CEO for fifteen years. In addition he has founded or advised several companies ranging from Neurodynamics to Blinkx. He has invested in numerous start-ups and has advised venture capital and private equity groups.

Alongside his entrepreneurial career, Mike has a number of board seats and advisory roles. He is a non-executive director of the British Library and Cambridge Enterprise and a council member of the Royal Academy of Engineering and of the Foundation for Science and Technology. He is a member of the advisory board of Tech City’s Investment Committee, an advisor to the Prince’s Trust technology group and a founding investor of Bridges Venturing.

During his career, Mike has received many awards and accolades including induction into the Digital Hall of Fame in 2012 and receiving the Outstanding Contribution award in the UKIT Industry awards.

Andrew Simms is the author of several books including Ecological Debt and the bestselling Tescopoly. He is a Fellow of nef (the new economics foundation) where he was policy director for many years, trained at the London School of Economics and was described by New Scientist magazine as, ‘a master at joined-up progressive thinking’. He is also one of the UK’s leading campaigners who co-authored the groundbreaking Green New Deal, and devised how to mark the day in the year when the world enters ‘ecological debt’. He also coined the term ‘Clone Towns’ in work pioneering new ways to revive local economies and recently proposed the idea of ‘National Gardening Leave’, combining a shorter working week with urban greening. He has witnessed first hand for more than twenty years failed international efforts to solve critical economic and environmental problems, from extreme poverty to climate change. His new book Cancel the Apocalypse: the New Path to Prosperity, newly published by Little Brown in 2013, is the result of his search for something better.
global grand challenges resilience speakers summit

Exploring collaborative approaches to tackling global grand challenges

Exploring collaborative approaches to tackling global grand challenges

Jo da Silva
Jo da Silva is a Director at Arup where she founded Arup International Development, a not-for-profit business which provides strategic advice and technical expertise to organisations committed to creating sustainable and resilient communities. She is a civil engineer whose career began in India and has subsequently encompassed the design and construction of buildings and infrastructure in four continents, as well as extensive experience working in post-disaster situations. She has particular expertise in improving access to essential services, low income housing and human settlements, urban infrastructure, post-disaster recovery and reconstruction, disaster risk reduction and climate change adaptation.

Jo sits on the International Development Policy Group at the Institution of Civil Engineers and lectures at the Centre for Sustainable Development at the University of Cambridge. In 2009, she was elected a Fellow of the Royal Academy of Engineering and in 2011 became an Officer of the British Empire (OBE) for services to engineering and to humanitarian relief. In 2012, she became the first woman to be selected by the ICE to deliver the prestigious, 9th International Brunel Lecture, entitled ‘Shifting Agendas: from response to resilience - the role of the engineer in disaster risk reduction’.

Bran Ferren
Bran Ferren, a designer and technologist, is Co-Founder and Chief Creative Officer of Applied Minds LLC, which invents and prototypes high-technology products and innovative business concepts for the aerospace, defense, intelligence, automotive, architecture, computing, and consumer products sectors.

He is former President of Research & Development and Creative Technology for the Walt Disney Company. Before that, he was President and Senior Designer for Associates & Ferren, which Disney acquired in 1993.

Bran works primarily as lead concept designer, systems engineer, and technologist, and is named inventor on approximately 300 current and pending US patents. He is an Oscar-nominated film visual effects designer and award-winning Broadway special effects, lighting, and sound designer. Other conceptual design work includes consumer products, World’s Fairs, theme parks, music tours, building architecture, and special purpose vehicles.

Design, engineering and technical clients include the Walt Disney Company, Northrop Grumman, Lockheed Martin, General Motors, IBM, Warner Communications, and Sony. He is a member of the Academy of Motion Picture Arts and Sciences and the Academy of Television Arts and Sciences. He has been a senior advisory board member for science, advanced technology, and innovation management to over a dozen Government and military agencies and the US Senate.

Paul Golby
Following a successful executive career in the Energy Industry, Dr Paul Golby has a portfolio of non-executive roles in the private and public sectors. Following a series of management appointments with Dunlop and BTR, he joined the Board of the ‘mini conglomerate’ Chaythlic plc in 1992, joining East Midlands Electricity in 1998, he became Chief Executive of E.ON UK in 2002. He built the business to become one of the UK’s leading energy companies. He retired from E.ON in December 2011.

Paul is currently a non-executive director of National Grid plc, Chairman of Engineering UK, Chairman of the Engineering and Physical Sciences Research Council, and a Member of the Prime Minister’s Council for Science and Technology. He is a Council Member of the Royal Academy of Engineering and a Fellow of the Royal Academy of Engineering, the Institution of Engineering and Technology, the Institution of Mechanical Engineers, and the Energy Institute.

He was awarded honorary degrees from Aston University in 2007 and Cranfield University in 2008 and made a CBE in 2011.

Zhang Jianyun
Dr Zhang Jianyun graduated from the East China Technical University of Water Resources in 1982, and obtained an MSc in engineering from Hohai University in 1987. From the National University of Ireland, he received an MSc in 1992 and a PhD in civil and environmental engineering in 1996.

Jianyun has led research in hydrology, hydrological modelling, flood forecasting, flood control, drought relief, impacts of climate change and hydroinformatics. As Chief Engineer of the Bureau of Hydrology in the Ministry of Water Resources, he oversaw flood forecasting of the whole country during 1998-2006. He also presided over the development of numerous software systems, such as National Flood Forecasting System, and Decision Supporting System for National Flood Controlling. He led the design of the National Flood Control and Drought Relief Command System (NFCDRCS) as well as the technical work for the construction of the system.

Jianyun has led over 20 Key National Research Programs, such as the National Science and Technology Research Program. He received one First Grade Prize and four Second Grade Prizes from the National Awards for Science and Technology Progress. He has published 5 monographs and over 100 papers. He was elected to membership of Chinese Academy of Engineering in 2009.

Robert Mair
Professor 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 between 2001 and 2011 and Senior Vice-President of the Royal Academy of Engineering from 2008 to 2011. Before he was appointed to a Professorship at Cambridge in 1998, he worked in industry for 27 years and in 1983 founded the Geotechnical Consulting Group, an international consulting company.

His research group specialises in the geotechnics of tunnelling and underground construction. He 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.

Professor Mair has advised on many infrastructure projects worldwide, and is a member of the Expert Panel on Crossrail, Europe’s largest civil engineering project. He chaired the Royal Society/Royal Academy of Engineering Report on Shale Gas for the UK Government, published in 2012.

New technologies provide better ways of predicting, preventing and responding to natural disasters and preparing ourselves for future extreme events, terror strikes, pandemics and climate shocks.
We could tell our story by the numbers: 120,000 employees working in over 500 facilities across the U.S.; 60,000 engineers, scientists and I.T. professionals, supporting 4,000 mission-critical programs in 70 countries. Lockheed Martin’s innovators and creative thinkers define our capabilities. They bring unparalleled experience and accomplishments to the skies and to the battlefields, as they answer 21st century challenges in cyber security, energy and climate change, healthcare, and transportation. Driving innovation that provides global security solutions — that’s how we define mission success.

www.lockheedmartin.com
Q: Tell us about yourself
A: I was raised in Bolton and ever since I was a child I always wanted to be an actor. As I grew older, I realised I had a love of writing instead of acting and before my GCSE’s I wanted to be a writer and film director instead. But then I started GCSE physics. My mind was introduced to a totally new world that stretched from the atomic scale to the cosmos. I was very lucky, my physics teacher used to do stand-up comedy – chain reactions in nuclear physics was taught by a revision of Diana Ross’ ‘I’m in the middle of a chain reaction’! Thanks to my fantastic teacher I soon became enthralled with science and so I studied nuclear physics at Birmingham University. I never really lost touch with writing though, and continued to pursue this in my spare time. After graduating from Birmingham University with a master’s degree in nuclear physics, I joined the Rolls-Royce graduate scheme, eventually moving to the Strategic Research Centre. Here, I work with my colleagues to develop design solutions and technologies of the future. In my spare time I write theatre and screenplays with my identical twin brother. We recently had a hit with a short comedy parody film of the Lord of the Rings.

Q: What attracted you to the competition?
A: I have recently combined my love of science with writing and started being active in promoting science and technology. I participated in the Famelab competition in December 2012 pretending to be Henri Becquerel and presented for three minutes on his accidental discovery of radioactivity. After this, I saw the advertisement for a film competition and knew I wanted to try making my first science film - ‘The Promise of Engineering’. I grew to recognize just how complex for clean water, and this made me decide to broaden the scope of my video. I became more interested in the relationship between water and energy. The water energy nexus represents two growing challenges but the one I feel most strongly about is affordable energy. The water energy nexus describes the world’s largest problem. Access to clean water and sustainable energy has a huge effect on the quality of life of millions of people, and this will only become more relevant as populations grow and countries become more developed. I think that the first step in addressing this problem is recognizing its complexity and scope. In order to create lasting solutions, engineers will have to focus on creating community specific infrastructure rather than temporary solutions.

Q: What do you think engineers need to communicate their goals and achievements better to the public?
A: Engineering and science in general always need to be communicated to the public better. While there is programming on science and engineering, there are many more ways to engage the public; music, songs, cartoons, theatre, film.

When I tell people I’m a physicist the first reaction is, ‘like the Big Bang theory’? I laugh and realise that while it paints scientists as massive geeks, ‘The Big Bang Theory’ has done an excellent job in making science appealing. I feel that in terms of media outreach, a web series format is a good way forward. The next generation are computer user heavy so that seems a good medium to engage them.

Q: What do you see as the most pressing challenge for the 21st century? How can engineers best address this?
A: This is a difficult question as I believe there are several key challenges but the one I feel most strongly about is affordable global energy generation. There are two main factors: one is the growing global population, and the associated energy demand; the second is developing countries increased need for energy. Non-renewable resources could be used up at an alarming rate and this needs to be addressed.

I feel that a greater research focus is needed on renewable energy sources in conjunction with use of nuclear power. This is something that needs buy in from many of the world’s nations. As renewable technologies are developed, they could be tied into projects that you wouldn’t usually consider. For example in the UK: tidal defence barriers for major flood areas could be combined with tidal turbines to generate electric power. The recycling of these turbines could lead to valuable composite materials that could potentially be used in biological systems such as hip replacements.

I think a lot of barriers need to come down between the definitions of scientific fields. Working at Rolls-Royce has really made me realise that good ideas can be generated by a team of mixed expertise. This is an obvious statement, but one that we must remind ourselves of. The UK has an amazing network of research centres and a strong historical manufacturing industry. With the correct focus and of course political buy in, I’m sure there is much we can achieve together both nationally and more importantly, globally.

Q: Do you think engineers need to communicate their goals and achievements better to the public?
A: I believe that the communication between engineers and the public is absolutely essential to create lasting changes in society. Although engineers are responsible for the technology that moves the world forward, they are not responsible for fostering the implementation and adoption of this technology. Engineers have the knowledge and skills set to tackle some of the world’s most challenging problems, but they must be effective communicators in order to educate the public on their ideas. Even the best idea, when poorly expressed, never becomes more than just an idea.

Q: What do you see as the most pressing challenge for the 21st century? How can engineers best address this?
A: All of my life I have enjoyed making movies. Growing up, whenever there was an option to do a video project for school, I took it. However, as I’ve gotten older, there have been fewer chances to do this. So when I saw the opportunity to make a video describing one of the Grand Challenges, it immediately seemed like something that I would be interested in. This competition gave me the opportunity to educate people on something that I’m passionate about, the water energy nexus, in a creative and appealing way.

Q: What attracted you to the competition?
A: As a First-Year Interest Group Mentor next year, where I will help new engineering students with their adjustment to college life, I wanted to do something that I’m passionate about, the water energy nexus, in a creative and appealing way.

Q: Tell us about your film and the inspiration behind it
A: I decided to do my film on sustainability – in my opinion the most important challenge on the list. I wanted it to be thought provoking and inspiring for both engineers and non engineers. I decided to make it less about the ‘parts and components’ and more about the people aspect. Engineering is not something that we pick up off the street; it is a very human creation. I felt that images, music and personal dialogue would best address this subject.

Q: Tell us about yourself
A: I believe that the communication between engineers and the public is absolutely essential to create lasting changes in society. Although engineers are responsible for the technology that moves the world forward, they are not responsible for fostering the implementation and adoption of this technology. Engineers have the knowledge and skills set to tackle some of the world’s most challenging problems, but they must be effective communicators in order to educate the public on their ideas. Even the best idea, when poorly expressed, never becomes more than just an idea.

Q: What do you see as the most pressing challenge for the 21st century? How can engineers best address this?
A: I believe that the communication between engineers and the public is absolutely essential to create lasting changes in society. Although engineers are responsible for the technology that moves the world forward, they are not responsible for fostering the implementation and adoption of this technology. Engineers have the knowledge and skills set to tackle some of the world’s most challenging problems, but they must be effective communicators in order to educate the public on their ideas. Even the best idea, when poorly expressed, never becomes more than just an idea.
As the UK’s national academy for engineering, we bring together the most successful and talented engineers from across the engineering sectors for a shared purpose: to advance and promote excellence in engineering.

We provide analysis and policy support to promote the UK’s role as a great place from which to do business. We take a lead on engineering education and we invest in the UK’s world class research base to underpin innovation. We work to improve public awareness and understanding of engineering.

We are a national academy with a global outlook and use our international partnerships to ensure that the UK benefits from international networks, expertise and investment.

The Academy’s work programmes are driven by four strategic challenges, each of which provides a key contribution to a strong and vibrant engineering sector and to the health and wealth of society:

1. Drive faster and more balanced economic growth
2. Foster better education and skills
3. Lead the profession
4. Promote engineering at the heart of society

Founded in 1964, the US National Academy of Engineering (NAE) is a private, independent, nonprofit institution that provides engineering leadership in service to the nation. The mission of the National Academy of Engineering is to advance the well-being of the nation by promoting a vibrant engineering profession and by marshalling the expertise and insights of eminent engineers to provide independent advice to the federal government on matters involving engineering and technology.

The NAE has more than 2,000 peer-elected members and foreign associates, senior professionals in business, academia, and government who are among the world’s most accomplished engineers. They provide the leadership and expertise for numerous projects focused on the relationships between engineering, technology, and the quality of life.

The NAE is part of the National Academies, which also includes the National Academy of Sciences (NAS), the Institute of Medicine (IOM), and the National Research Council (NRC). The NAE operates under the same congressional act of incorporation that established the NAS, signed in 1863 by President Lincoln. Under this charter the NAE is directed “whenever called upon by any department or agency of the government, to investigate, examine, experiment, and report upon any subject of science or art.”

The Chinese Academy of Engineering (CAE) is a national and independent organisation composed of elected members of the highest calibre from the national community of engineering and technological sciences. Its missions are to initiate and conduct strategic studies, provide consultancy services for decision-making on key national issues in engineering and technological sciences, promote the development of engineering and technological sciences in China and devote itself to the benefit and welfare of society.

The main functions of the CAE are:

1. To bring into full play the combined expertise of its members in decision-making for national and regional economic development and social progress, as well as to undertake studies, consultancy and strategy evaluation for key projects, and to advise central and local governments on top-priority issues and orientation of key investments.
2. To organise studies on issues of orientation and frontiers of key engineering science and technology, promoting innovation capacity in industrial technology and improving management quality of science and engineering projects.
3. To carry out extensive academic exchanges and collaborations at home and abroad at all levels.
4. To popularise scientific knowledge and to contribute to the promotion of the standard of engineering science and technology and the quality of workforce in China.
5. To safeguard science ethics, carry forward the scientific spirit, and vigorously promote the construction of socialist civilisation.
EPSRC, keeping the UK at the heart of global engineering research

EPSRC is proud to support the first Global Grand Challenges Summit.

"The value of this first international event cannot be underestimated. The world faces challenges that span borders, both natural and man-made. To tackle them we must cooperate (including across disciplines, institutional and national boundaries) to develop solutions to the problems that affect us all.

We are delighted to be working closely with the Royal Academy of Engineering and other partners on the Global Grand Challenges Summit. EPSRC's engineering programmes fund some of the best engineering research in the world and this is a fantastic opportunity to inspire current and future leaders of engineering research to work on these problems as part of world-leading collaborations."

Professor David Delpy, CEO EPSRC

ENGINEERING AND PHYSICAL SCIENCES RESEARCH COUNCIL

EPSRC is the UK's main agency for funding research in engineering and physical science, supporting leading-edge science that is vital to our future.

EPRoyal Academy of Engineering and other partners on the Global Grand Challenges Summit. EPSRC's engineering programmes fund some of the best engineering research in the world and this is a fantastic opportunity to inspire current and future leaders of engineering research to work on these problems as part of world-leading collaborations."

EPSRC is the UK's main agency for funding research in engineering and physical science, supporting leading-edge science that is vital to our future. EPSRC invests around £800 million a year in research and postgraduate training across the research landscape - from information technology to structural engineering, and mathematics to materials science - to help the nation handle the next generation of technological change.

Global Grand Challenges Summit

Exploring collaborative approaches to tackling global grand challenges
global grand challenges summit

Exploring collaborative approaches to tackling global grand challenges

#GGCS2013 @GGCSLondon