WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Global Agenda

# Convening Innovators in Science and Technology

## Annual Meeting of the New Champions 2015

Dalian, People's Republic of China 9-11 September

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W. Lee Howell
Managing Director
Member of the Managing Board
World Economic Forum

Discoveries in science and technology are arguably the greatest agent of change in the modern world. While never without risk, these technological innovations can lead to solutions for pressing global challenges such as providing safe drinking water and preventing antimicrobial resistance. But lack of investment, outmoded regulations and public misperceptions prevent many promising technologies from achieving their potential.

In this regard, we have convened leaders from across the science and technology communities for the Forum's Annual Meeting of the New Champions 2015 – the foremost global gathering on innovation, entrepreneurship and technology. More than 1,600 leaders from business, government and research from over 90 countries will participate in 100-plus interactive sessions to:

- Contribute breakthrough scientific ideas and innovations transforming economies and societies worldwide
- Catalyse strategic and operational agility within organizations with respect to technological disruption
- Connect with the next generation of research pioneers and business innovators reshaping global, industry and regional agendas

By convening leaders from science and technology under the auspices of the Forum, we aim to:

- Raise awareness of the promise of scientific research and highlight the increasing importance of R&D efforts
- Inform government and industry leaders about what must be done to overcome regulatory and institutional roadblocks to innovation
- Identify and advocate new models of collaboration and partnership that will enable new technologies to address our most pressing challenges

We hope this document will help you contribute to these efforts by introducing to you the experts and innovators assembled in Dalian and their fields of research.

# Business Champions

**Katrine Bosley** Editas Medicine
**Martin Bruncko** AeroMobil
**Cheng Wei Didi** KuaiDi Group
**Quentin Clark** SAP SE
**Paul Daugherty** Accenture
**Kim Dong-Kwan** Hanwha Group
**Ariel Garten** InteraXon
**Guo Ping** Huawei Technologies
**Ken Hu** Huawei Technologies
**Rob Hulme** Bayer CropScience
**Norbert Hültenschmidt** Bain & Company
**Ahmad Al Khowaiter** Saudi Aramco
**André Kudelski** Kudelski Group
**Patrick Kung** Royal Philips
**Lee Bowei** LCY Chemical Corp
**Liu Tianwen** iSoftStone Information Technology
**Jean-Luc Lowinski** Sanofi China
**Yogesh Malik** VimpelCom
**Hugh Martin** Sensity Systems
**Seong-Woo Nam Hanwha** Q CELLS Korea
**Christophe Nicolas** Kudelski Security
**Ian Roberts** Bülher
**Rong Hai Xi'an** Seastar Scientech Investment Holding
**Dror Sharon** Computer Physics
**Daljit Singh** Fortis Healthcare
**Ellen Strahlman** Becton, Dickinson and Company
**Patrick Thévoz** Flyability
**Angela Nan Wang** Neusoft Corporation
**Wang Yongfeng** Neusoft Corporation
**Yao Weiguang** Dow Chemical Company
**Zhang Bo** Didi KuaiDi Group
**Zhao Yiwu** Naton Medical Group

# Business Champions

*Editas Medicine*

**Katrine Bosley** is Chief Executive Officer of Editas Medicine, whose mission is to translate its genome editing technology into a novel class of human therapeutics that enable precise and corrective molecular modification to treat the underlying cause of a broad range of diseases at the genetic level. Bosley has held several positions in the medical industry, at The Broad Institute – a biomedical and genomic research centre, Adnexus Therapeutics, Biogen Idec, and others. She is a graduate of Cornell University.

*AeroMobil*

**Martin Bruncko** is Chief Strategy Officer and Chief Financial Officer of AeroMobil, a flying car company. He is a technology entrepreneur and investor, and was previously a public-policy leader. He holds management, board and advisory positions in several globally innovative deep-technology companies in Europe, covering such areas as engineering, biotech and fintech. Previously, he founded and served as Executive Chairman of Neulogy, the first major advisory and investment boutique in Central and Eastern Europe focusing on R&D and technology start-ups. Earlier, Bruncko was a Senior Director and Head of Europe at the World Economic Forum. He also held several senior positions in the Government of Slovakia, including Junior Minister for Innovations and Deputy for European Affairs of the Minister of Finance. Bruncko has a BA in International Relations and Modern Thought and Literature from Stanford University and an MPA in International Development from Harvard Kennedy School.

*Didi KuaiDi Group*

**Cheng Wei** is Founder, Chairman of the Board and Chief Executive Officer of Didi KuaiDi Group, the largest one-stop mobile transportation platform in the world that aims to fulfil the massive unmet commuting demand in China by aggregating various transport tools such as taxi rides, private car rides and even bus and chauffer services. Prior to that, Cheng worked at Alibaba for eight years. He graduated from the Beijing University of Chemical Technology.

*SAP SE*

**Quentin Clark** is Chief Technology Officer of SAP SE and a member of the Global Managing Board. He is responsible for driving the company's technology vision and leading the efforts to build and innovate world-class products that positively impact people, organizations and customers. With more than 20 years of enterprise experience, Clark has been instrumental in developing and driving product strategy, including definition, planning and engineering, as well as leading industry-disruptive product launches across organizations. Clark holds a Bachelor's degree in Computer Science and Physics from the University of Massachusetts.

*Accenture*

**Paul Daugherty** is Chief Technology Officer of Accenture, where he is responsible for R&D, technology strategy and emerging technologies, among others. He has over 25 years' experience in the technology industry. After joining the company in 1986, he founded practices in areas such as the cloud, open source, big data and cognitive computing. He holds a BSE in Computer Engineering from the University of Michigan.

*Hanwha Group*

**Kim Dong-Kwan** is Managing Director of the Hanwha Group and Chief Strategy Officer of Hanwha Q CELLS. Through its expertise in petrochemical technology, Hanwha challenges the industry with new state-of-the art technologies such as solar energy, nanotechnology, biologics and secondary battery materials. Kim earned a BA in Government from Harvard University.

*InteraXon*

**Ariel Garten** is Co-Founder and Chief Executive Officer of InteraXon, a brain sensing headband company, also called Muse. Garten studied at the University of Toronto and researched hippocampal neurogenesis at Toronto's Krembil Neuroscience Centre. Garten is also is a psychotherapist and a fashion designer. Her unusual combination of science and art is integral to the design of every aspect of Muse, and to InteraXon's unique approach to brain-sensing technology.

*Huawei Technologies*

**Guo Ping** is Deputy Chairman of the Board and Rotating Chief Executive Officer of Huawei. He joined Huawei in 1988 and has served as an R&D Project Manager, General Manager of Supply Chain, Director of Huawei Executive Office, Chief Legal Officer, President of the Business Process & IT Management Department, President of the Corporate Development Department, and Chairman and President of Huawei Device. Guo holds a master's degree from Huazhong University of Science and Technology.

*Huawei Technologies*

**Ken Hu** is Deputy Chairman and Rotating Chief Executive Officer of Huawei Technologies. Hu joined Huawei in 1990 and has served as President of Marketing and Sales in China, President of the Latin America Region, President of Global Sales, Chief Sales and Service Officer, Chief Strategy and Marketing Officer, Chairman of the Corporate Global Cyber Security Committee, Chairman of the Board of Directors of Huawei USA, Deputy Chairman of the Board, Rotating Chief Executive Officer and Chairman of the Human Resources Committee. Hu holds a Bachelor's degree from Huazhong University of Science and Technology.

*Bayer CropScience*

**Rob Hulme** is Managing Director and Country Head for Greater China of Bayer CropScience, one of the world's leading research-intensive companies in agriculture. The company offers a broad range of innovative chemical and biological products for improving plant health. Hulme has over 15 years of experience with Bayer, finding solutions to improve crops. He studied science and management at the University of New England, University of Melbourne and Harvard Business School.

*Bain & Company*

**Norbert Hültenschmidt** is Partner, Director and Head of Healthcare Practice, Europe, Middle East and Africa at Bain & Company. He has served pharma companies around the globe and developed an integrated healthcare perspective from his work in biotech, diagnostics and medtech. Hültenschmidt has extensive experience in innovation management and open innovation. He is the author of multiple thought pieces on the future of healthcare, innovation and how to improve efficiency and effectiveness in pharma. He holds an MA in Chemistry and a PhD in Technical Chemistry from RWTH Aachen.

*Saudi Aramco*

**Ahmad Al Khowaiter** is Chief Technology Officer of Saudi Aramco. He has held various technical roles in oil and gas production organizations ranging from design, project management, commissioning and operations; as well as a number of supervisory, managerial, and general management positions. Al Khowaiter holds a BSc in Chemical Engineering from the King Fahd University of Petroleum & Minerals, an MSc in Chemical Engineering from the University of California at Santa Barbara, and an MBA as a Sloan Fellow from the Massachusetts Institute of Technology.

*Kudelski Group*

**André Kudelski** is Chairman of the Board and Chief Executive Officer of the Kudelski Group, a world leader in digital security and convergent media solutions for the delivery of digital and interactive content. Kudelski obtained a degree in physical engineering from the Swiss Federal Institute of Technology in Lausanne. He then held the position of R&D Engineer at Kudelski SA and in Silicon Valley, before becoming Pay TV Product Manager and then Director of Nagravision, Kudelski SA's pay TV division. In 1991, Kudelski succeeded his father Stefan Kudelski as President and Chief Executive Officer of Kudelski SA. He has been a member of Kudelski's Board of Directors since 1987, and is also Chairman of the Board's Strategy Committee.

*Royal Philips*

**Patrick Kung** is Executive Vice-President, Member of the Executive Committee and Chief Executive Officer of Greater China for Royal Philips. Prior to that, he was with Motorola for 27 years gaining extensive global general management experience, with expertise in the China market. He started his career as an engineer focused on product development and operations, including developing Motorola's alphanumeric paging and two-way paging businesses. Kung holds a BSEE degree from Tatung Institute of Technology in Taiwan and an MSEE degree from Tennessee Tech University in the US. He was granted four US patents for innovations in paging early in his career.

*LCY Chemical Corporation*

**Lee Bowei** is Chairman of the Board of LCY Chemical Corporation. Under his leadership since 1990, its goal is to be a world-class and state-of-the-art chemical company. He was named Green Innovation Entrepreneur in the Ernest & Young Entrepreneurs in 2012. He earned a BA in Chemical Engineering from the Massachusetts Institute of Technology and an MBA from Stanford University.

*iSoftStone Information Technology*

**Liu Tianwen** is Chairman and Chief Executive Officer of iSoftStone Information Technology, a leader in smart city and industry internet development, and a leading innovative technology services provider. He has over 20 years' management experience in the IT industry and technology innovation. Liu holds a Master's in Electrical Engineering from the University of Massachusetts and an MBA from the Massachusetts Institute of Technology.

*Sanofi China*

**Jean-Luc Lowinski** is Senior Vice-President, Asia, of Sanofi China. Prior to that, he spent many years at Bayer, where he was Head of Healthcare Asia and Global Head of the Animal Health Division. He holds a PhD in Veterinary Science from the University of Nantes, France, and is a graduate of INSEAD.

*VimpelCom*

**Yogesh Malik** is Chief Technology Officer of VimpelCom. His career includes appointments at TIW, Tata/AT&T and Ericsson in the Czech Republic, Brazil, China and Canada in various senior positions. Since joining VimpelCom, Malik has driven a new approach to IT and network development and management aimed at making the company a world leader in efficiency and innovation. He holds an Engineering degree in Electronics from MSU University and an Executive MBA from IMD, Lausanne, Switzerland.

*Sensity Systems*

**Hugh Martin** is Chairman and Chief Executive Officer of Sensity Systems. He created the vision for Sensity Systems and the Light Sensory Network and is responsible for steering the company's strategic course. His 35-year track record as an entrepreneurial leader of cutting-edge technology companies, new ventures and high-growth businesses includes serving at the helm of numerous highly successful organizations. Prior to Sensity, Martin was Founder, Chairman and Chief Executive Officer of Pacific Biosciences, a leading company in third-generation DNA sequencing. Before that, he founded and was Chairman, President and Chief Executive Officer of ONI Systems, a high-speed optical telecommunications systems company.

*Hanwha Q CELLS Korea*

**Seong-Woo Nam** has been the Chairman and Chief Executive Officer of Hanwha Q CELLS Korea since April 2014. Nam has rich experience and expertise in a broad range of management disciplines with a strong track record of achievement. A 30-year management veteran, he served as the Executive Vice-President and General Manager of Samsung's IT Solutions Business at Samsung Electronics. Prior to that, Nam spent eight years directing the Business Innovation team across a broad range of business segments including Planning, Supply Chain Management (SCM), Logistics and Information Strategy. He received his Bachelor's degree in Political Science from Sogang University in 1983.

*Kudelski Security*

**Christophe Nicolas** is Senior Vice-President and Head of Kudelski Security, a cybersecurity division offering a range of security services and solutions for media, financial services and the public and defence sectors. In his 16 years with the Kudelski Group, Nicolas has held various management positions in engineering at Nagracard and Nagravision, and also served as Chief Security Officer and Chief Technology Officer. Nicolas earned Bachelor's and Master's degrees in Computer Science from the Swiss Federal Institute of Technology, and an MBA from IMD, Lausanne. He is a member of the IEEE Computer Society.

*Bühler*

**Ian Roberts** is Chief Technology Officer of Bühler. He graduated in Chemical Engineering and obtained a PhD in Process Engineering from the University of Wales. From 1997 through 2009, he held various management positions at Nestlé, acting among other things as an internal management consultant at its Swiss headquarters, Director of Innovation for Nestlé Mexico, and Director of the Chocolate Centre of Excellence in Switzerland. He has been Chief Technology Officer at Bühler since 2010.

*Xi'an Seastar Scientech Investment Holding*

**Rong Hai** is President and Founder of Xi'an Seastar Scientech Investment Holding. Rong is Professor of Xi'an Jiaotong University. He also serves as Vice-Chairman of the Council of Chinese Non-governmental Scien-Tech Promotion Association and Standing Director of China Non-governmental Scien-Tech Entrepreneur Association. Rong was named as "Excellent Scien-Tech Worker of China" and "Excellent Entrepreneur of Non-governmental Enterprises". Rong studied in the Computer Department of Xi'an Jiaotong University and completed a postgraduate degree in Shanghai Fudan University. He also holds an EMBA from Beijing University.

*Consumer Physics*

**Dror Sharon** is Co-Founder and Chief Executive Officer of Consumer Physics, a company that created a pocket molecular sensor for individuals. This technology uses the cloud and could have major applications for research and medicine. He holds an MBA from the MIT Sloan and a BSc EE from Technion Israel institute of Technology.

*Fortis Healthcare*

**Daljit Singh** is President of Fortis Healthcare, as well as Chairman of the Malar Hospitals and Board Member of Lanka Hospitals Corporation. He has over 40 years of management experience. Singh is an acknowledged expert and thought leader in the domain of healthcare delivery. He has represented Fortis at industry fora and led several healthcare-related committees. Singh is a graduate of the Indian Institute of Technology, Delhi, and was a Commonwealth Scholar to the Senior Management Programme at the Manchester Business School.

*Becton, Dickinson and Company*

**Ellen Strahlman** is Executive Vice-President, Research and Development, and Chief Medical Officer of Becton, Dickinson and Company. She has more than 20 years of international experience in the healthcare industry including biopharmaceuticals, medical devices and public health. She earned an MD from the Johns Hopkins University School of Medicine, a MHSc from the Johns Hopkins School of Public Health and a BA from Harvard University.

*Flyability*

**Patrick Thévoz** is Co-Founder and Chief Executive Officer of Flyability, a Swiss company developing the world's first collision-tolerant flying robot, which can operate in any complex environment, especially indoors and inside structures. After focusing on the development of microsystems for applications in the biotechnology and space industries during his MSc at the EPFL and the University of California at Santa Barbara, Thévoz started his career as a strategy consultant for the life sciences industry.

*Neusoft Corporation*

**Angela Nan Wang** is Senior Vice-President and Secretary of the Board of Directors of Neusoft Corporation. Since joining the company in 1995, she has served successively as Manager of the Software Center's Java Application Department, Vice-General Manager of Middleware Technology Branch, Manager of Mobile Internet Division, Deputy Director of Advanced Automotive Electronic Technology Research Center and General Manager of the International Business Development Division. She holds a doctorate in Computer Applications from Northeastern University, China.

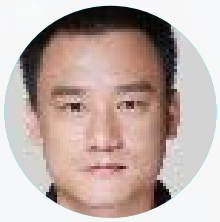
*Neusoft Corporation*

**Wang Yongfeng** is President of Neusoft Corporation, which he joined in 1992. He is also a Professor at the School of Software of Beihang University. Wang graduated from the College of Computer Science and Technology of Jilin University and received his Master's degree in Artificial Intelligence of Computer Applications from Jilin University.

*Dow Chemical Company*

**Yao Weiguang** is Chief Technology Officer of Dow Asia Pacific at Dow Chemical Company. He identifies long-term technology opportunities in the region. He is also a Board Director of Advanced Electrolyte Technologies at the East China University of Science and Technology. He holds 17 patents and one patent application. Yao earned a BA in Physics from Yancheng Normal University in China, an MA in Chemical Engineering and a PhD in Polymer Science and Engineering from East China University of Science and Technology.

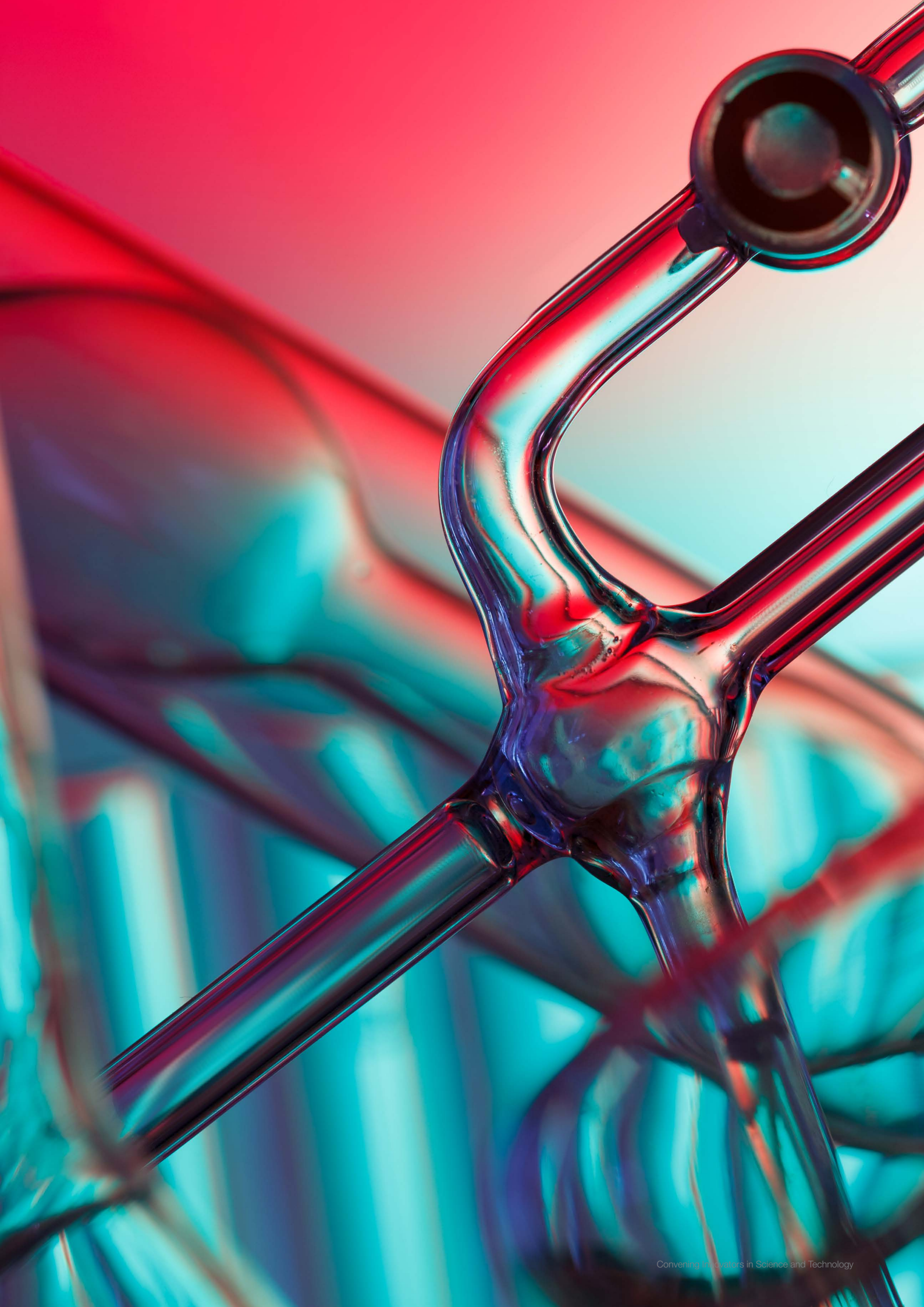
*Didi KuaiDi Group*



**Zhang Bo** is Co-Founder and Chief Technology Officer of Didi KuaiDi Group, the largest one-stop mobile transportation platform in the world. Zhang established the product, technology and big data system for DiDi from the very beginning, leading the evolution of mobile transportation products such as taxi, private cars and hitch and chauffer services. Zhang led the research and development of nine mobile product lines in Baidu, undertook various significant projects and developed 10 software applications with over a 100 million users. Zhangbo holds a BA and an MA in Institute of Software from Wuhang University.

*Naton Medical Group*

**Zhao Yiwu** is President of the Naton Medical Group, as well as Vice-President of China National Scientific Instruments & Materials Corporation, Vice-President of International Confucian Association, Vice-Chairman of the Chinese Society for Biomaterials and Managing Director of the Chinese Society for Drug Regulation. Over the past years, Zhao has supported technological exchanges in medical sciences and medical education, for which he was granted the 3rd Honorary Member in the history of Chinese Medical Association.


Convening Innovators in Science and Technology

# Policy Leaders

**Ali Abbasov** Ministry of Communication and High Technologies of Azerbaijan
**Yuichiro Anzai** Japan Society for the Promotion of Science
**Guntis Belevics** Ministry of Health of Latvia
**Jean-Pierre Bourguignon** European Research Council
**Chen Zhangliang** China Association for Science and Technology
**Francis S. Collins** National Institutes of Health
**Mauro Dell'Ambrogio** State Secretary for Education, Research and Innovation of Switzerland
**Leela Devi Dookun-Luchoomun** Ministry of Tertiary Education, Science, Research & Technology
**Yuko Harayama** Cabinet Office of Japan
**Thomas Insel** National Institute of Mental Health
**Carlos Moedas** European Commission
**Qi Ye** Brookings-Tsinghua Center for Public Policy
**Núria Sebastián Gallés** European Research Council
**Hakubun Shimomura** Ministry of Education, Culture, Sports, Science and Technology of Japan
**Sathasivam Subramaniam** Ministry of Health of Malaysia
**Cao Xuetao** Chinese Academy of Sciences
**Yang Fuqiang** Natural Resources Defense Council

# Policy Leaders

*Ministry of Communication and High Technologies of Azerbaijan*

**Ali Abbasov** is Minister of Communication and High Technologies of Azerbaijan. He is responsible for accelerating the transition to the information society and formation of the digital economy, applications of e-government solutions and new technologies, and development of broadband services and human resources. He is also a lecturer and researcher in the fields of digital economy, artificial intelligence, network design and application, and was a Professor of Information and Computer Sciences at the Azerbaijan University of Technologies. He is the author of over 160 scientific and technical works, monographs and textbooks, and holds a PhD in Microelectronics from the Academy of Sciences of Ukraine.

*Japan Society for the Promotion of Science*

**Yuichiro Anzai** is President of the Japan Society for the Promotion of Science (JSPS). As Japan's core funding agency supporting scientific advancement, JSPS administers grants for scientific research and other funding programmes to underwrite scientific research initiatives, cultivate budding researchers and promote international collaboration.

*Ministry of Health of Latvia*

**Guntis Belevics** is Minister of Health of Latvia. He puts focus on a healthy lifestyle in childhood and empowering individuals to take responsibility for their own health. Before joining the government, he founded and led several pharmaceutical companies. Belevics has a PhD in Biophysics and a Pharmacist Diploma from the Latvian Academy of Medicine.

*European Research Council*

**Jean-Pierre Bourguignon** is President of the European Research Council (ERC), which is responsible for encouraging the highest quality research in Europe through competitive funding and supporting investigator- driven frontier research across all fields, on the basis of scientific excellence. A mathematician by training, Bourguignon served as Director of the Institut des Hautes Études Scientifiques (IHÉS). He has received the Prix Paul Langevin, Prix du Rayonnement Français in Mathematical Sciences and Physics from the Académie des Sciences de Paris. He is a foreign Member of the Royal Spanish Academy of Sciences. In 2005, he was elected Honorary Member of the London Mathematical Society and has been the secretary of the mathematics section of the Academia Europaea. In 2008, Bourguignon was made Doctor Honoris Causa of Keio University in Japan and, in 2011, Doctor Honoris Causa of Nankai University in China.

*China Association for Science and Technology*

**Chen Zhangliang** is Vice-President of the China Association for Science and Technology. He has been actively involved in agrobiotechnology research and biosafety issues. Chen has been Vice-President of Peking University, Director of the China National Laboratory of Protein Engineering and Plant Genetic Engineering, and Vice-Governor of Guangxi Zhuang Autonomous Province, in charge of agriculture, rural development, poverty alleviation as well as science and technology. He has received many honours including Top 10 Outstanding Young Persons in China, UNESCO Javed Husain Prize for Young Scientists and Time's Global 100 Roster of Young Leaders for the New Millennium. He holds a PhD in Molecular Biology and Biotechnology from Washington University.

*National Institutes of Health*

**Francis S. Collins** is the Director of the National Institutes of Health. In that role, he oversees the work of the largest supporter of biomedical research in the world, spanning the spectrum from basic to clinical research. Collins is a physician-geneticist noted for his landmark discoveries of disease genes and his leadership of the international Human Genome Project, which culminated in the completion of a finished sequence of the human DNA instruction book. He served as Director of the National Human Genome Research Institute at the NIH from 1993-2008. Before coming to the NIH, Collins was a Howard Hughes Medical Institute investigator at the University of Michigan. He is an elected member of the Institute of Medicine and the National Academy of Sciences, was awarded the Presidential Medal of Freedom in November 2007, and received the National Medal of Science in 2009.

*State Secretary for Education, Research and Innovation of Switzerland*

**Mauro Dell'Ambrogio** is State Secretary for Education, Research and Innovation of Switzerland. Previously, he held a number of public offices in Switzerland. Earlier, after four years heading a group of private clinics, he was made Director of the University of Applied Sciences of Southern Switzerland in 2003. He holds a Doctorate in Law from the University of Zurich.

*Ministry of Tertiary Education, Science, Research and Technology of Mauritius*

**Leela Devi Dookun-Luchoomun** is Minister of Tertiary Education, Science, Research and Technology of Mauritius. She holds a BSc Hons from the University of Delhi and completed her Postgraduate Certificate in Education at the MIE and a Postgraduate Diploma in Education from the University of Brighton. She is also a part-time lecturer at the Mauritius Institute of Education.

*Cabinet Office of Japan*

**Yuko Harayama** is an Executive Member of the Council for Science and Technology Policy (CSTP), Cabinet Office of Japan. Previously, she served as the Deputy Director of the Directorate for Science, Technology and Industry at the Organisation for Economic Co-operation and Development (OECD). She is a Chevalier of the French Legion of Honour, recognized by the President of France for her research on science and technology policy. She was Professor in the Management Science and Technology Department at the Graduate School of Engineering of Tohoku University.

*National Institute of Mental Health*

**Thomas Insel** is Director of the National Institute of Mental Health (NIMH), the component of the US National Institutes of Health charged with generating the knowledge needed to understand, treat and prevent mental disorders. His tenure at NIMH has been distinguished by groundbreaking findings in practical clinical trials, autism research and the role of genetics in mental illness. Insel has served on numerous academic, scientific and professional committees and boards. He is a Member of the Institute of Medicine, a Fellow of the American College of Neuropsychopharmacology and a recipient of several awards, including the Outstanding Service Award from the US Public Health Service.

*European Commission*

**Carlos Moedas** is Commissioner of Research, Science and Innovation at the European Commission. He is responsible for research funding programmes, notably Horizon 2020, making sure it contributes to the Commission's jobs, growth and investment package; promoting the international excellence of the EU's research and science and strengthening research capacities and innovation across all member states; evaluating how EU-funded research can be used more effectively; ensuring that Commission proposals are based on scientific evidence; encouraging private companies to apply research to meet the challenges faced by society and create more high-quality jobs.

*Brookings-Tsinghua Center for Public Policy*

**Qi Ye** is Director of the Brookings-Tsinghua Center for Public Policy. He is a leading expert on China's environment policy. His research focuses on China's policies on climate change, environment, energy, natural resources and urbanization. His recent work examines low-carbon development in China, including an annual report analysing how China is balancing its economic growth and environmental challenges. Qi publishes extensively on and serves as reviewer for a number of international journals, including *Science*, *Nature* and *Proceedings of National Academy of Sciences*.

*European Research Council*

**Núria Sebastián Gallés** is Vice-President of the Scientific Committee at the European Research Council. Her work focuses on the study of learning and language processing with an emphasis on bilingual populations. Research in her laboratory extends from infants to adults with methodologies that are based on behavioural as well as physiological and brain imaging responses.

*Ministry of Education, Culture, Sports, Science and Technology of Japan*

**Hakubun Shimomura** is Minister of Education, Culture, Sports, Science and Technology, and Minister of Olympics and Paralympic Games of Japan. Shimomura was appointed as Minister of Education, Culture, Sports, Science and Technology in December 2012. He will oversee preparations by the Organizing Committee for the 2020 Summer Olympics on behalf of the National Government in Tokyo.

*Ministry of Health of Malaysia*

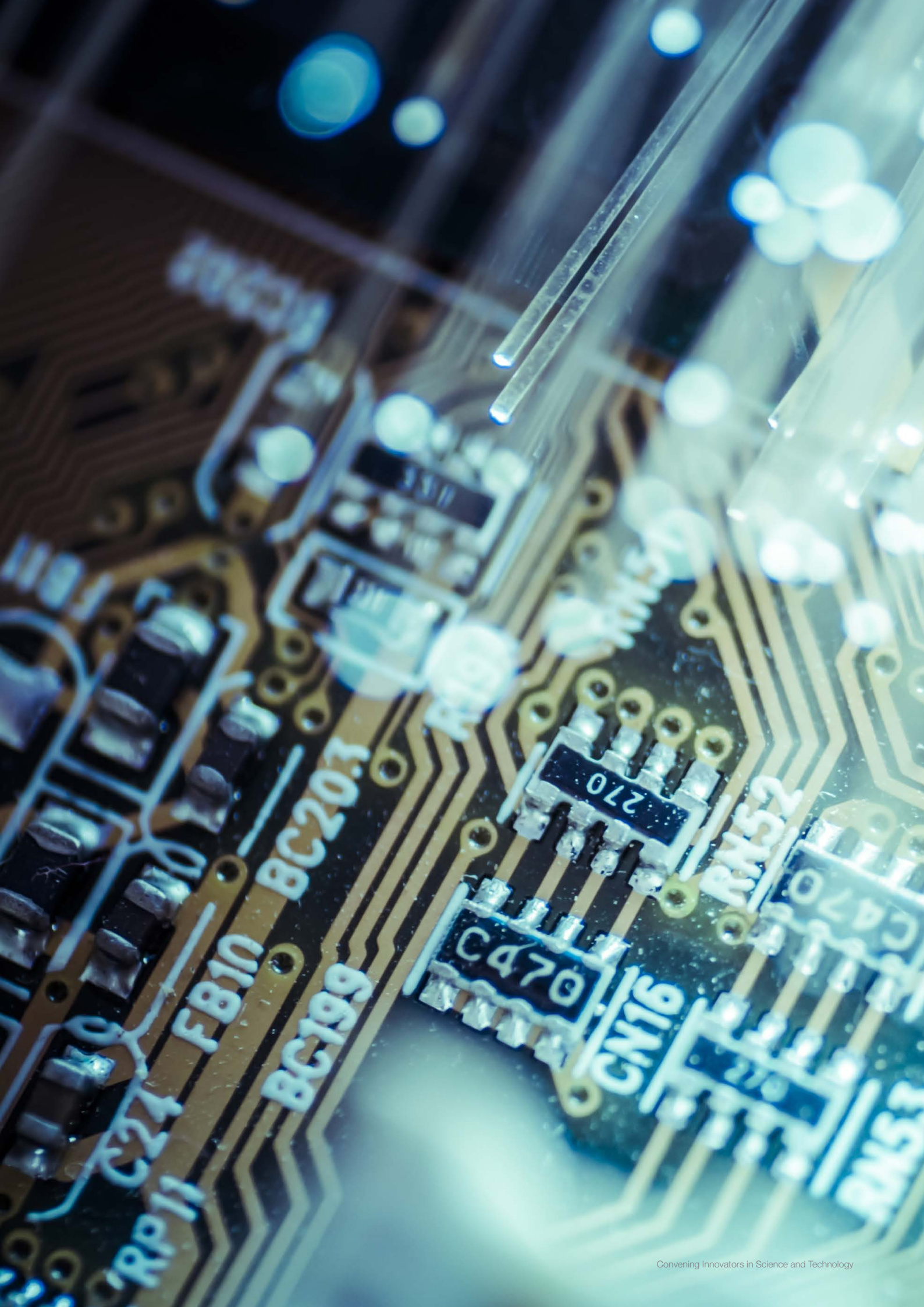
**Sathasivam Subramaniam** is Minister of Health of Malaysia. He previously served as Deputy President of the Malaysian Indian Congress and is the one of the two full ministers representing the Malaysian Indian community. He holds an MBBS from the National University of Singapore and a Diploma in Dermatology from the University of Wales.

*Chinese Academy of Medical Sciences*

**Cao Xuetao** is President of the Chinese Academy of Medical Sciences. He has been Professor and Director of National Key Laboratory of Medical Immunology since 2006 and was elected as a member of the Chinese Academy of Engineering in 2005. His major interests are immunobiology, immune regulation, cancer immunotherapy and gene therapy. His group proposed several new approaches for DC-based immunotherapy and gene therapy for cancer. As a corresponding author, he has published about 200 original peer-reviewed papers.

*Natural Resources Defense Council*

**Yang Fuqiang** is Senior Adviser for Energy, Environment and Climate Change at the Natural Resources Defense Council, People's Republic of China. He is an expert on climate change and energy and has been involved in energy and environmental issues for more than three decades. Yang was Director of Global Climate Solutions, WWF International, from 2008 to 2010, Vice-President of Energy Foundation and Chief Representative of the Energy Foundation Beijing Office from 2000 to 2008. The EF China Sustainable Energy Program was dedicated to public policy development in China aimed at cost-effective carbon emissions reductions through the deployment of energy efficiency and renewable energy technologies. Yang has a PhD in Industrial Engineering a BSc in Physics.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# University Leaders

**Liu Changxi** Beijing University of Chinese Medicine
**Tan Chorh-Chuan** National University of Singapore
**Suzanne Fortier** McGill University
**Linda P. Fried** Mailman School of Public Health, Columbia University
**Alice P. Gast** Imperial College London
**Michael Hengartner** University of Zurich
**Sung-Mo "Steve" Kang** Korea Advanced Institute of Science and Technology
**Hiroaki Kitano** Systems Biology Institute
**Hongbo Chen** Tuspark Research Institute
**Sang Yup Lee** Korea Advanced Institute of Science and Technology
**Li Jinghai** Chinese Academy of Sciences
**Peter Mathieson** University of Hong Kong
**Andrew W. Moore** Carnegie Mellon University
**Dean Ornish** Preventive Medicine Research Institute
**Eden Woon Yi-Teng** Hong Kong University of Science and Technology
**Zhang Dongxiao** Peking University
**Thierry Zomahoun** African Institute for Mathematical Sciences

# University Leaders

*Beijing University of Chinese Medicine*

**Liu Changxi** is Deputy Director of the Health Promotion Research Institute at Beijing University of Chinese Medicine and Deputy Director of the State Key Laboratory of Health Promotion of the Ministry of Education. He is also Vice-Chairman of the Health Promotion and Rehabilitation branch of China Association of Chinese Medicine and Vice-Chairman of the Health Promotion subcommittee of the World Federation of Chinese Medicine Societies. He holds a PhD.

*National University of Singapore*

**Tan Chorh-Chuan** is President of the National University of Singapore (NUS). From 1997-2000, Tan was Dean of the Faculty of Medicine at NUS; and from 2000 to 2004 served as Director of Medical Services at the Ministry of Health in Singapore and concurrently as a Professor of Medicine at NUS. He is Deputy Chairman, Agency for Science, Technology and Research, Singapore; and Chairman of the Board for the National University Health System. He is a Member of the Board of Directors of the Monetary Authority of Singapore; and a Fellow of the Royal College of Physicians; Royal Australasian College of Physicians; American College of Physicians; Polish Academy of Medicine; and Royal Geographical Society, UK. Tan is the recipient of several awards. He has a degree in medicine and a PhD from the National University of Singapore and is also a renal physician.

*McGill University*

**Suzanne Fortier** is Principal of McGill University. She is a crystallographer, specializing in the development of mathematical and artificial intelligence methodologies for protein structure determination. She has made contributions to the development of novel techniques in crystallographic data mining to gain new insights from the large structural databases. Fortier has been a Member of the Protein Engineering Network of Centres of Excellence, the Institute for Robotics and Intelligent Systems and Communications and Information Technology Ontario.

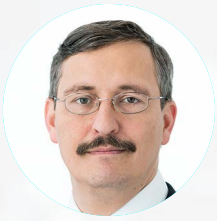
*Mailman School of Public Health*

**Linda P. Fried** is Dean and DeLamar Professor of Public Health at the Mailman School of Public Health at Columbia University. She is a leader in the fields of epidemiology and geriatrics and has dedicated her career to the science of healthy ageing. As an internationally renowned scientist, Fried is the recipient of numerous awards and a member of numerous editorial and advisory boards. She earned an MPH from the Johns Hopkins Bloomberg School of Public Health, an MD from Rush Medical College and a BA from the University of Wisconsin.

*Imperial College London*

**Alice P. Gast** is the President of Imperial College London. She is an internationally renowned academic leader, scholar and researcher. Her academic interest is in surface and interfacial phenomena, in particular the behaviour of complex fluids. Gast has co-authored numerous scientific publications and a classic textbook on colloid and surface phenomena. She was a professor of chemical engineering at Stanford University from 1985 to 2001 and affiliated with the Stanford Synchrotron Radiation Laboratory.

*University of Zurich*



**Michael Hengartner** is the President of the University of Zurich. His research focuses on understanding basic biological processes and, more specifically, on germ cell death, DNA damage, neurobiology, microbial glycobiology and systems biology. Hengartner holds an Executive MBA from IMD Lausanne and is the recipient of several awards for his groundbreaking research on the molecular basis of apoptosis, among them the Swiss National Latsis Prize. In 2010, he was awarded the Credit Suisse Award for Best Teaching at the University of Zurich.

*Korea Advanced Institute of Science and Technology*

**Sung-Mo "Steve" Kang** is President of the Korea Advanced Institute of Science and Technology (KAIST). He is an electrical engineering scientist, professor, author, inventor and entrepreneur. Kang was appointed as the second chancellor of the University of California, Merced, in 2007. Kang teaches and has written extensively in the field of computer-aided design for electronic circuits and systems. Kang led the development of the world's first 32-bit microprocessor chips as a technical supervisor at AT&T Bell Laboratories and designed satellite-based private communication networks as a member of technical staff. Kang holds 15 US patents and has won numerous awards for his groundbreaking achievements in the field of electrical engineering.

*Systems Biology Institute*

**Hiroaki Kitano** is President of the Systems Biology Institute, President and Chief Executive Officer of Sony Computer Science Laboratories and a Principal Investigator at Okinawa Institute of Science and Technology and RIKEN Center for Integrative Medical Sciences. The research behind his AIBO and QRIO projects led to the founding of the RoboCup annual international robotics competition in 1997. The goal of RoboCup is to create a team of autonomous robotic footballers that would be able to beat the best team in the world, by 2050. He has made significant contributions to systems biology, including a contribution to the Systems Biology Markup Language.

*Tuspark Research Institute*

**Hongbo Chen** is Vice-Dean of the Tuspark Research Institute for Innovation at Tsinghua University. He has more than 10 years of experience in planning, developing and operating Tsinghua University Science Park, particularly in setting up an innovation service system to help small and medium-sized high-tech enterprises. He has been Member of the Board of the International Association of Science Parks.

*Korea Advanced Institute of Science and Technology*

**Sang Yup Lee** is Distinguished Professor and Director of the Korea Advanced Institute of Science and Technology. He is one of the world's leading experts in bio-engineering and biotechnology. His research has focused on metabolic engineering, biochemical engineering, industrial biotechnology and biorefineries, systems biology, synthetic biology, in silico biotechnology, nanobiotechnology and disease diagnostics. He is a Fellow of many scientific entities, such as the American Association for the Advancement of Science and the Korean Academy of Science and Technology, and has published more than 500 journal papers and 580 patents.

*Chinese Academy of Sciences*

**Li Jinghai** is Professor and Vice-President of the Chinese Academy of Sciences (CAS). He established the Energy-Minimization Multi-Scale model for gas-solid systems, which has been extended to many different complex systems, and is also engaged in the research of clean coal technology. Li sits on editorial committees and international advisory boards for several international periodicals. He received a variety of prizes and honours, both national and international. Li earned a PhD. from the CAS Institute of Process Engineering and conducted his postdoctoral research at the City University of New York and the Swiss Federal Institute of Technology.

*University of Hong Kong*

**Peter Mathieson** is President and Vice-Chancellor of the University of Hong Kong. He is a teacher, clinician, medical researcher and academic leader. He is also a distinguished nephrologist with a clinical interest in autoimmune renal diseases, and has rich experience in developing research and innovation strategies.

*Carnegie Mellon University*

**Andrew W. Moore** is the fifth Dean of the School of Computer Science at Carnegie Mellon University. In 2006, he opened the Pittsburgh office of Google Inc. While at Google, Moore led projects to improve user experiences in advertising and shopping and help combat fraud. He was also responsible for developing new products and services. Moore's research interests broadly encompass the field of big data-applying statistical methods and mathematical formulas to massive quantities of information. His past research includes improving the ability of robots and other automated systems to sense the world around them and respond appropriately. He is a Fellow of the Association for the Advancement of Artificial Intelligence (AAAI) for his significant contributions to machine learning, data mining and statistical artificial intelligence, as well as for his role in transferring those technologies to industry and government.

*Preventive Medicine Research Institute*

**Dean Ornish** is the Founder and President of the non-profit Preventive Medicine Research Institute and Clinical Professor of Medicine at the University of California, San Francisco. He received his MD from the Baylor College of Medicine, was a clinical fellow in medicine at Harvard Medical School and completed an internship and residency in internal medicine at the Massachusetts General Hospital. For over 36 years, Ornish has directed clinical research demonstrating, for the first time, that comprehensive lifestyle changes may begin to reverse even severe coronary heart disease without drugs or surgery.

*Hong Kong University of Science and Technology*

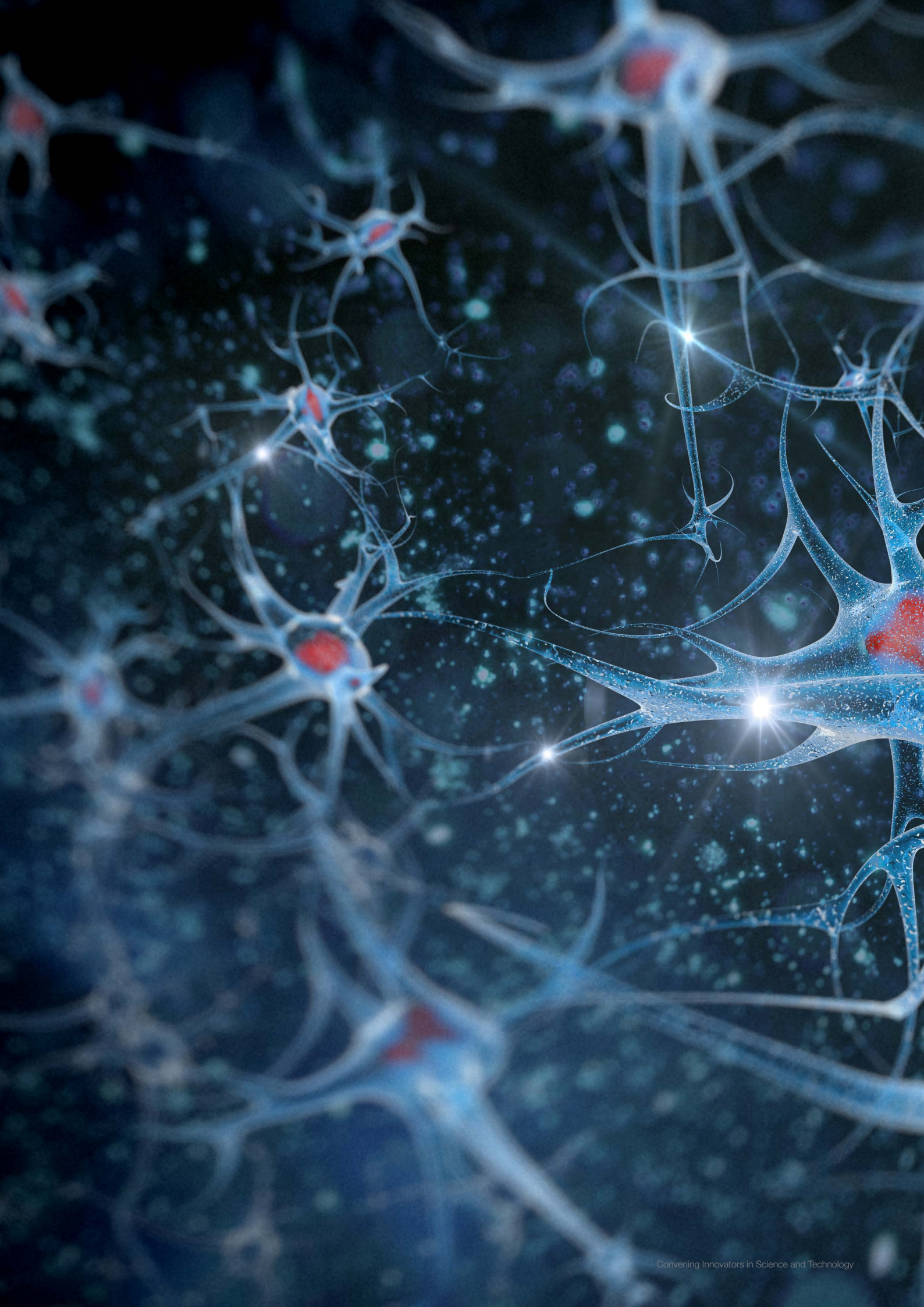
**Eden Woon Yi-Teng** is Vice-President of Institutional Advancement at the Hong Kong University of Science and Technology. Prior to joining HKUST, Woon received his BA from the University of Iowa and his MA, MSc and PhD degrees in Mathematics from the University of Washington. He is a member of the Council on Foreign Relations in New York.

*Peking University*

**Zhang Dongxiao** is Dean and Chair Professor of the College of Engineering of Peking University. He also holds positions as Chair Professor at the University of Southern California, Miller Chair Professor at the Department of Petroleum and Geological Engineering at the University of Oklahoma, and Senior Scientist at Los Alamos National Laboratory. He has authored two books and published over 110 peer-reviewed papers. He earned both his Master's degree and PhD in hydrology and water resources in 1992 and 1993, respectively, from the University of Arizona. Zhang is an internationally-known expert in groundwater hydrology, unconventional oil and gas production, and geological carbon sequestration.

*African Institute for Mathematical Sciences*

**Thierry Zomahoun** is President and Chief Executive Officer of the African Institute for Mathematical Sciences. He is leading the growth of Africa's first and largest network of centres of excellence in mathematical sciences. Under his tenure, AIMS has grown into a global network of world-class scholars and academics from over 36 countries and a pan-African graduate body of hundreds of alumni comprising 41 African nationalities. In 2013, Zomahoun initiated the AIMS Next Einstein Forum (NEF), a global forum for science that seeks to make Africa the next hub for global science, innovation and youth entrepreneurship. He is a graduate of the National University of Benin, McGill University, HEC Montreal and the University of Geneva.



# Communication Experts

**Nick Campbell** Nature Publishing Group
**Philip Campbell** Nature Publishing Group
**I-han Chou** Nature Publishing Group
**Jeffrey M. Drazen** New England Journal of Medicine
**Mariette DiChristina** Scientific American
**Susan Goldberg** National Geographic Magazine
**Fred Guterl** Scientific American
**Charlotte Haug** The Journal of the Norwegian Medical Association
**Joe Palca** National Public Radio (NPR)
**James T. Powell** Thomson Reuters
**Naomi Oreskes** History of Science, Harvard University
**Cliff Ransom** Popular Science
**Michael Segal** Nautilus
**Gary Wong** New England Journal of Medicine
**Rui-Ping Xiao** New England Journal of Medicine

# Communication Experts

*Nature Publishing Group*

**Nick Campbell** is the Executive Editor of *Nature* and oversees its partnerships and supplements. Campbell holds a PhD in evolutionary and population genetics from Southern Cross University in Australia. His postdoctoral research was in Steve Barker's group at the Institute for Molecular Bioscience and School of Molecular and Microbial Sciences at the University of Queensland. He spent a decade as a research geneticist before joining the Nature Publishing Group, where he has held a variety of editorial positions since 2001.

*Nature Publishing Group*

**Philip Campbell** is the Editor-in-Chief of the science journal, *Nature*. He heads a team of about 90 editorial staff around the world and has direct editorial responsibility for the content of *Nature*'s editorials, writing some of them. His role is to ensure that the quality and integrity appropriate to the *Nature* name are maintained. He sits on the executive board of *Nature*'s parent company, Nature Publishing Group. He gained an MSc in astrophysics at Queen Mary, University of London, before doing his PhD in upper atmospheric physics at the University of Leicester.

*Nature Publishing Group*

**I-han Chou** is Senior Editor of Biology at *Nature*. Her areas of responsibility include sensory and motor systems, decision-making, executive function, psychiatric disease and neuroscience in general. She has a BA from Harvard University and a PhD from the Massachusetts Institute of Technology, and has achieved postdoctoral work at the University of California.

*The New England Journal of Medicine*

**Jeffrey M. Drazen** joined the *New England Journal of Medicine* as Editor-in-Chief in 2000. Drazen's responsibilities include oversight of all editorial content and policies. He served as an Associate Editor and Editorial Board Member for the Journal of Clinical Investigation, the American Journal of Respiratory Cell and Molecular Biology and the American Journal of Medicine. A specialist in pulmonology, Drazen maintains an active research programme. He has published more than 300 articles on topics such as lung physiology and the mechanisms involved in asthma. In 1999, he delivered the Amberson Lecture, the major research address at the annual meeting of the American Thoracic Society. In 2000, he received the Chadwick Medal from the Massachusetts Thoracic Society for his contributions to the study of lung disease.

*Scientific American*

**Mariette DiChristina** oversees *Scientific American, ScientificAmerican.com, Scientific American* Mind and all newsstand special editions. She is the first woman to assume the top post in *Scientific American*'s 166-year history. Under her leadership, the magagine received a 2011 National Magazine Award for General Excellence. She is an adviser for the Citizen Science Alliance; was named an AAAS Fellow in 2011; and was President (in 2009 and 2010) of the 2,500-member National Association of Science Writers. She was an Adjunct Professor in the graduate Science, Health and Environmental Reporting programme at New York University for several years. DiChristina is a frequent lecturer and has appeared at the New York Academy of Sciences, California Academy of Sciences, Yale University and New York University, among others. She is the recipient of many awards.

*National Geographic Magazine*

**Susan Goldberg** is Editor-in-Chief at *National Geographic Magazine*. Previously, she was executive editor for federal, state and local government coverage for Bloomberg News in Washington DC. Goldberg has a Bachelor's degree in Journalism from Michigan State University. She is active in professional journalism organizations, serving as President of the American Society of News Editors, and on the board of the Accrediting Council on Education in Journalism and Mass Communication. She also is Co-Chair of the Medill School of Journalism's Board of Visitors at Northwestern University.

*Scientific American*

**Fred Guterl** is Executive Editor of *Scientific American*. He led the magazine to its first General Excellence Award from the National Society of Magazine editors in 2011 for the first time in its 169-year history. Previously, Guterl was a Deputy Editor at Newsweek International, an Editor of *Discover* and *IEEE Spectrum*. Guterl holds a Bachelor's degree in electrical engineering from the University of Rochester, and has taught science writing at Princeton University.

*The Journal of the Norwegian Medical Association*

**Charlotte Haug** is the Editor-in-Chief of the *Journal of the Norwegian Medical Association*, the only peer-reviewed general medical journal in Norway. She has been a Member of International Committee of Medical Journal Editors since 2002 and a Council Member of the Committee on Publication Ethics since 2005. She holds an MD and a PhD in Infectious Diseases and Immunology from the University of Oslo. After a decade working in clinical medicine and research at the National Hospital, she focused on priority setting and supervision of healthcare systems in Norway and globally, working for the National Board of Health and the Department of Health. She was Head of the section for specialized healthcare at the Norwegian National Board of Health, and supervised health policy research at SINTEF Unimed, largest independent research organization in Scandinavia. Her research concentrated on international comparative studies of healthcare systems.

*National Public Radio (NPR)*

**Joe Palca** is a science correspondent for NPR. Since joining NPR in 1992, Palca has covered a range of science topics – everything from biomedical research to astronomy. Palca was formerly Washington news editor for Nature, and a senior correspondent for Science Magazine. Palca's journalism and science writing has won numerous awards, including the National Academies Communications Award, the Science-in-Society Award of the National Association of Science Writers, the American Chemical Society James T. Grady-James H. Stack Award for Interpreting Chemistry for the Public, the American Association for the Advancement of Science Journalism Prize, and the Victor Cohn Prize for Excellence in Medical Writing. Palca holds a PhD. in psychology from the University of California at Santa Cruz where he worked on human sleep physiology.

*Thomson Reuters*

**James T. Powell** is Chief Technology Officer of Thomson Reuters. In this role, he oversees the company's technology initiatives and strategy, including the application of newly emerging technologies to advance the development and delivery of intelligent information. Previously, he was Chief Technology Officer for the Markets division. In his 14 years at Thomson Reuters, Powell has held a number of senior leadership positions including Chief Technology Officer for Enterprise, Chief Technology Officer and Global Head of Product Development, Head of Technology Strategy and Chief Technology Officer for the Reuters Financial division. He earned a BSc in Mathematics and an MSc in Industrial Robotics from Imperial College London.

*History of Science, Harvard University*

**Naomi Oreskes** is Professor of the History of Science and Affiliated Professor of Earth and Environmental Sciences at Harvard University. She is the author of many books, articles, and opinion pieces. She has won numerous prizes and awards, including, most recently, the 2015 Herbert Feis Prize of the American Historical Association for her contributions to public history.

*Popular Science*

**Cliff Ransom** is Editor-in-Chief of *Popular Science* and has been its Executive Editor since February 2011. Prior to that, he served as Deputy Editor at Budget Travel and Features Editor at National Geographic Adventure. He started his editorial career in science magazines, first at *The Sciences*, a publication of the New York Academy of Sciences, and then at *Discover*. Before moving into media, he worked as a researcher in a genomics lab at New York University and an economic botany lab at the New York Botanical Garden. Ransom has a BA from NYU in molecular biology.

*Nautilus*

**Michael Segal** is Editor-in-Chief of the *Nautilus*. Prior to that, he was Editor for *Nature Nanotechnology* and a Postdoctoral Associate at the Massachusetts Institute of Technology. He has published papers on astrophysics, plastic electronics, oil drilling, and the history of science. He holds a doctorate in Electrical Engineering from the Massachusetts Institute of Technology.

*New England Journal of Medicine*

**Gary Wong** is Editor of the *New England Journal of Medicine* and a Professor in the Department of Paediatrics at the Chinese University of Hong Kong. Wong has a strong interest in the different aspects of allergic and autoimmune diseases. In particular, he is interested in the epidemiology and environmental determinants of asthma and related allergic disorders. He is an executive member of the Global Initiative for Asthma and a member of the steering committee of the ISAAC (International Study of Asthma and Allergies in Childhood) research group. He is also one of the executive members of the Asia-Pacific Association of Pediatric Allergy, Respirology and Immunology.

*New England Journal of Medicine*

**Rui-Ping Xiao** is Editor of the *New England Journal of Medicine* and an Associate Editor of the *Journal of Molecular Medicine*. Xiao's research has been focused on cardiovascular and metabolic diseases with an emphasis on a translational approach to take bench discoveries into clinically relevant situations. Ongoing research directions include signalling pathways involved in metabolic syndrome and associated cardiovascular complications.

# Researchers at the Vanguard of Innovation

**Ana Claudia Arias** University of California, Berkeley
**Ellen Backus** Max Planck Institute for Polymer Research
**Santiago Badia** International Center for Numerical Methods in Engineering
**Frédérique Battin-Leclerc** Centre National de la Recherche Scientifique (CNRS)
**John Brownstein** Harvard Medical School
**Justine Cassell** Carnegie Mellon
**Che Ting Chan** Hong Kong University of Science and Technology
**Georges Chen Guoqiang** Tsinghua University
**David Crisp** California Institute of Technology
**Wu Dekai** Hong Kong University of Science and Technology
**Murali Doraiswamy** Duke University
**Peter Edwards** Singapore-ETH Center
**Thomas Ellis** Imperial College London
**Cho Eun Ae** Korea Advanced Institute of Science and Technology
**Daniel Fletcher** University of California, Berkeley
**Anna Fontcuberta i Morral** Ecole Polytechnique Fédérale de Lausanne (EPFL)
**Pascale Fung** Hong Kong University of Science and Technology
**Lee Haeshin** Korea Advanced Institute of Science and Technology
**Matthew C. Hansen** University of Maryland
**He Kebin** Tsinghua University
**John Heap** Imperial College London
**Jung Hee Tae** Korea Advanced Institute of Science and Technology
**Amy Herr** University of California, Berkeley
**Pamela Hinds** Stanford University
**Ralph Hollis** Carnegie Mellon University
**Jason Hong** Carnegie Mellon University
**Huang Xia** Tsinghua University
**Chengyu Jiang** Peking Union Medical College
**Li Jinhui** Tsinghua University
**David Klug** Imperial College London
**Kei May Lau** Hong Kong University of Science and Technology
**Lynn Loo** Princeton University
**Thom Mason** Oak Ridge National Lab
**Mark McCaughrean** European Space Agency
**Tom Mitchell** Carnegie Mellon University
**Daniel B. Neill** Heinz College
**Laura Nyström** ETH Zurich
**Illah R. Nourbakhsh** Carnegie Mellon University
**Karen Polizzi** Imperial College London
**Mark Post** University of Maastricht
**Stuart J. Russell** University of California, Berkeley
**Donald Sadoway** Massachusetts Institute of Technology
**Randy Sargent** Carnegie Mellon University
**Aarti Singh** Carnegie Mellon University
**Kenneth Smith** Stanford University
**Lydia Sohn** University of California, Berkeley
**Guy-Bart Stan** Imperial College London
**Shana Sturla** ETH Zurich
**Fahmy Tarazi** Harvard Medical School
**Emmanuel Tsesmelis** European Organization for Nuclear Research (CERN)
**Ning Wang** Hong Kong University of Science and Technology
**William L. Whittaker** Carnegie Mellon University
**Zhiyu Yang** Hong Kong University of Science and Technology
**Hong Yang** ETH Zurich
**Lei Zhou** Chinese Center for Disease Control and Prevention

# Researchers at the Vanguard of Innovation

*Flexible electronic systems*

**Ana Claudia Arias** is Associate Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley. She received her PhD in Physics from the University of Cambridge in the United Kingdom in 2001. Arias was the Manager of the Printed Electronic Devices Area and a Member of Research Staff at PARC, a Xerox Company. Her research focuses on the use of electronic materials processed from solution in flexible electronic systems. She uses printing techniques to fabricate flexible large-area electronic devices and sensors.

*Dynamics of water*

**Ellen Backus** is Project Leader at the Max Planck Institute for Polymer Research. Her research focuses on the structure and dynamics of water at interfaces using (multidimensional) sum-frequency generation spectroscopy. She has a PhD on the dynamics of molecules on surfaces from Leiden University.

*Magnetohydrodynamics*

**Santiago Badia** is Associate Professor at the Universitat Politècnica de Catalunya and Adjoint Researcher at the International Center for Numerical Methods in Engineering, where he leads the High Performance Scientific Computing department. Badia works on finite element methods, numerical analysis and large-scale computing, and has worked on fluid-structure interaction problems and magnetohydrodynamic systems. One of the main applications of his research is the simulation of some technological components of fusion reactors. Badia is the recipient of several awards.

*Reactions and reactors*

**Frédérique Battin-Leclerc** is Research Director at the Centre National de la Recherche Scientifique (CNRS). Her research activities focus on reactions and reactors. She is the author of *Cleaner Combustion, Developing Detailed Chemical Kinetic Models*, an advanced multisectional approach for modelling the gas-to-particle process in flames presentation.

*Computational epidemiology*

**John Brownstein** is an Associate Professor at Harvard Medical School and directs the Computational Epidemiology Group of the Children's Hospital Informatics Program in Boston. He was trained as an epidemiologist at Yale University. His research aims to have translation impact on the surveillance, control and prevention of disease. Brownstein has advised the World Health Organization, Institute of Medicine, the US Department of Health and Human Services and the White House on real-time public health surveillance. He has authored over 100 peer-reviewed articles on epidemiology and public health.

*Human-computer interaction*

**Justine Cassell** is Professor and Director Emerita of the Human-Computer Interaction Institute and Associate Vice-Provost of Technology Strategy and Impact at Carnegie Mellon University. She has 20 years of experience in developing technologies that preserve and showcase the most human and humane of our capabilities, and in communicating the risks and opportunities technologies that ignore these guidelines pose to society. She is an AAAS Fellow and earned a BA from Dartmouth, an MPhil from the University of Edinburgh and a PhD in Linguistics and Psychology from the University of Chicago.

*Physical properties of matter*

**Che Ting Chan** is Professor at the Hong Kong University of Science and Technology. His research interests include application of first principles and related methods to study the electronic, structural and other physical properties of matter; surface physics; photonic band gaps; and material physics. Chan was also co-winner of an Outstanding Scientific Accomplishment Award (Solid State Physics) in the US Department of Energy Materials Science Research Competition.

*Microbial physiology and Metabolic engineering*

**Georges Chen Guoqiang** is Professor at the School of Life Sciences of the Tsinghua University and Editor for the Journal of Biotechnology. He has been working on microbial physiology, metabolic engineering and fermentation process development. Chen has published over 200 international peer-reviewed papers with more than 5,000 citations (H-Index 35) since joining Tsinghua University. With over 23 issued patents and 36 pending patents, his technologies have been provided to several companies that succeed in mass production of microbial polyhydroxyalkanoates (PHA).

*Space exploration*

**David Crisp** is Senior Research Scientist for the Jet Propulsion Laboratory at California Institute of Technology. Since receiving his PhD from the Geophysical Fluid Dynamics Program at Princeton University in 1984, he has focused primarily on the development of radiative transfer algorithms for remote sensing and climate models of Venus, Earth and Mars. He contributed to the NASA technology programme by developing *in situ* atmospheric structure and meteorological instruments and serving as the Chief Scientist of the NASA New Millennium Program from 1998 to 2001.

*Artificial intelligence and language*

**Wu Dekai** is Professor at the Department of Computer Science and Engineering at Hong Kong University of Science and Technology. His cross-disciplinary work relates language, music, artificial intelligence, cognition, evolution and culture. In 2011 he was named Founding ACL Fellow at the Association for Computational Linguistics for pioneering contributions to machine learning of the relationships between different languages. His research has contributed to developing foundations of modern statistical machine translation technology, and built the world's first Web translator.

*Cognitive and emotional health*

**Murali Doraiswamy** is Professor of Psychiatry and Behavioural Sciences at Duke University. He directs a leading clinical trials unit that is focused on understanding mechanisms of cognitive and emotional health, and on developing novel personal diagnostic tools and therapeutics (both behavioural and pharmacological) for neurocognitive enhancement. He is a Member of the Executive Board of Duke's Brain and Society theme, which explores how research on cognition, emotions and behaviour may be helpful for addressing some of the major societal challenges of our time. He also developed many of the leading treatments widely used today for clinical depression and Alzheimer's disease.

*Cities, ecology and science for public policy*

**Peter Edwards** is Director of the Singapore-ETH Center, Future Cities Laboratory, where his work focuses on the application of science and technology for better public policy. Since 1993 he has been Professor of Plant Ecology at ETH where he has also served as Chairman and Dean of the Department of Environmental Systems Science. He was a founder and the first Executive Secretary of the Institute for Ecology and Environmental Management, a professional organization for environmental practitioners.

*Synthetic biology*

**Thomas Ellis** is Senior Lecturer of Synthetic Biology at Imperial College London. He conducts experimental research in synthetic biology, focusing on genome engineering, genome design, the function of DNA sequence, standards in biological engineering, extreme life and antibiotic synthesis. The major focus of his lab is to study the construction of regulatory networks and understand how to build a designer genome from parts.

*Materials science*

**Cho Eun Ae** is an Associate Professor at the Department of Materials Science and Engineering in the Korea Advanced Institute of Science and Technology (KAIST).

*Bioengineering and medical devices*

**Daniel Fletcher** is Professor of Bioengineering at the University of California, Berkeley. His laboratory studies the molecular basis of cell movements. In particular, he is interested in the way that the cytoskeleton generates, transmits and responds to forces, and aims to determine how these forces are coordinated for cell shape changes such as those involved in motility. To enable these studies, he is developing new instrumentation and measurement technologies to quantify cell and molecular mechanics. His tools include optical microscopy, atomic force microscopy (AFM), optical trapping and microfabrication, as well as biophysical modelling and simulation. He is developing medical devices that aid in clinical diagnosis and treatment of disease.

*Semiconductor materials*

**Anna Fontcuberta i Morral** is Head of the Laboratory of Semiconductor Materials at Ecole Polytechnique Fédérale de Lausanne (EPFL). Her research activities are centred on the synthesis of semiconductor nanowires, novel heterostructure by nanoepitaxy, optical and transport experiments, and solar cells.

*Intelligent systems*

**Pascale Fung** is Professor of the Department of Electronic and Computer Engineering at Hong Kong University of Science and Technology. Fung's research interests lay in building intelligent systems that can understand and empathize with humans. To achieve this goal, her specific areas of research are statistical natural language processing, spoken language systems and music information retrieval.

*Biomimetics*

**Lee Haeshin** is a Professor in the Department of Chemistry of the Korea Advanced Institute of Science and Technology. He is interested in biomimetics, which is the application of systems found in nature to the study and design of engineered systems. He is developing a novel adhesive for biomedical applications inspired by the mussel adhesive molecules known to possess powerful adhesion capability even in the presence of water. This holds potential for applications such as medical bio-adhesives, drug delivery, surface modification for cell therapy and super hydrophobic/hydrophilic surfaces.

*Land cover mapping*

**Matthew C. Hansen** is a Professor in the Department of Geographical Sciences at the University of Maryland. He is a remote sensing scientist with a research specialization in large-area land cover and land use change mapping. His research is focused on developing improved algorithms, data inputs and thematic outputs that enable the mapping of land cover change at regional, continental and global scales. Such maps enable better-informed approaches to natural resource management, including deforestation and biodiversity monitoring, and can also be used by other scientists as inputs to carbon, climate and hydrological modelling studies.

*Air pollution control*

**He Kebin** is Dean of the School of Environment of Tsinghua University. He is an expert in air pollution control, focusing on motor-vehicle emission assessment and control as well as regional emission inventory and control strategies. He has contributed to a number of articles and books on sustainable urban mobility and transport and holds a PhD in environmental engineering from Tsinghua University.

*Synthetic biology*

**John Heap** is a Lecturer in Synthetic Biology in the Department of Life Sciences of Imperial College London. His research group is based in the Centre for Synthetic Biology and Innovation (CSynBI). He is interested in the design and construction of synthetic biological systems that process matter, energy and information in useful ways not observed in nature. His research involves both the development of foundational biological technologies and their use for applications, mainly in chemical manufacture and in health. An important aspect of this research is developing reliable approaches to implement synthetic biological systems using diverse, industrially-relevant organisms.

*Chemical and biomolecular engineering*

**Jung Hee Tae** is a Professor in the Department of Chemical and Biomolecular Engineering at the Korea Advanced Institute of Science and Technology (KAIST).

*Biological system engineering*

**Amy Herr** is a Professor of Bioengineering at the University of California, Berkeley. Her research focuses on engineering innovation for analysis of complex biological systems – as is required to address questions important to both fundamental biological systems and applied clinical research. She employs a combination of approaches drawn from chemical engineering, mechanical engineering and electrical engineering with strong foundations in biology, materials science and analytical chemistry. Herr is striving to advance the "mathematization" of biology and medicine.

*Technology and society*

**Pamela Hinds** is Associate Professor of Management Science and Engineering at Stanford University. She studies the effect of technology on groups. Hinds has conducted extensive research on the dynamics of geographically distributed work teams, particularly those spanning national boundaries. She explores issues of culture, language, shared identity, conflict and the role of face-to-face meetings in promoting knowledge-sharing and collaboration. She also conducts research on professional service robots in the work environment, examining how people make sense of them and how they affect work practices.

*Hardware systems*

**Ralph Hollis** is Research Professor at the Robotics Institute of Carnegie Mellon University. His research involves the creation of innovative new hardware, software and systems. He is working on the improvement of the assembly of small high-precision electromechanical products such as computer storage devices, medical devices, communication devices and other high-density mechatronic equipment. Moreover he works on human-computer interaction to enable truly transparent and high-fidelity interaction with eventual application to medicine, computer-augmented design and telemanipulation, including scaled manipulation of microscopic and nanoscopic objects. Hollis also develops intelligent mobile robots that are dynamically stable, including both rolling and walking machines.

*Human-computer interaction*

**Jason Hong** is an Associate Professor in the Human Computer Interaction Institute, part of the School of Computer Science at Carnegie Mellon University. He works in the areas of ubiquitous computing and usable privacy and security. He is also an author of *The Design of Sites*, a popular book on web design using web design patterns. Hong is also a Co-Founder of Wombat Security Technologies, which focuses on the human side of computer security. Hong received his PhD from Berkeley and his undergraduate degrees from Georgia Institute of Technology.

*Wastewater treatment*

**Huang Xia** is Professor and Director of the State Key Joint Laboratory of Environment Simulation and Pollution Control of the School of Environment of Tsinghua University. Her work includes hybrid membrane technologies for water and wastewater treatment, microbial fuel cells for simultaneous electricity generation and wastewater treatment, novel biological nitrogen and phosphorus removal processes, and excess sludge reduction and resource recovery. She is also Executive Associate Editor-in-Chief of Frontiers of Environmental Science & Engineering in China and has published more than 100 papers in the past five years. She earned a PhD in Environmental Chemistry and Engineering from the Tokyo Institute of Technology.

*Molecular pathogenesis*

**Chengyu Jiang** is Professor and Head of the Department of Biochemistry and Molecular Biology at Peking Union Medical College. Her research is to elucidate molecular pathogenesis of RNA viruses such as SARS-CoV, Avian Flu H5N1, S-OIV-H1N1 and Ebola, as well as to explore the molecular pathogenesis of acute lung injury induced by nanoparticles. Jiang has published extensively in numerous peer reviewed journals. She is also an inventor of a number of international patents. She received numerous honours, including Cheung Kong Scholar, the Young Woman Scientist of China, and National Outstanding Young Award Fund. She obtained her PhD from Brown University followed by postdoctoral training at Massachusetts General Hospital, affiliated with Harvard Medical School.

*Pollution and waste control*

**Li Jinhui** is Professor of the School of Environment at Tsinghua University and Executive Director of the Basel Convention Regional Centre for Asia and the Pacific, which is supervised by the secretariat of the Basel Convention, UNEP. His research in environmental sciences started in 1983 and now focuses on management and treatment technology of e-waste and hazardous waste, pollution control engineering of solid waste, environmental risk assessment and soil pollution remediation.

*Chemical biology*

**David Klug** is Professor at the Faculty of Natural Sciences, Department of Chemistry, at Imperial College London. He is Co-Founder and Chair of the Institute of Chemical Biology, which coordinates teaching and research activities in chemical biology. He also chairs the Single Cell Proteomics Project, a £5 million multidisciplinary collaboration of eight research teams developing and applying novel platform technologies to high throughput and single cell analysis. He sits on the Research Committees of both the Faculty of Natural Sciences and Faculty of Medicine with a particular remit for translational research.

*LED-based lighting*

**Kei May Lau** is Professor at the Hong Kong University of Science and Technology, which she joined in 2000 after years of industrial and academic experience in Massachusetts. Envisioning the dawn of the Solid-State Lighting revolution, she founded the Photonics Technology Center to pursue research in LED and LED-based lighting and display technologies. She is regarded as one of the leaders in greater China spearheading this research and is well-recognized in the international arena. Her research effort focuses on innovative ideas to be transferred to industry.

*Biological engineering*

**Lynn Loo** is Professor of Engineering at Princeton University in the Chemical and Biological Engineering Department. Her research focuses on the structure development of complex materials for low-cost, lightweight and scalable plastic circuits and solar cells. As Associate Director of External Partnerships at the Andlinger Center for Energy and the Environment, Loo also leads the Princeton Affiliates Network, which promotes teacher-student-practitioner interactions and fosters technology transfer on campus. Her research has expanded to include macro-energy systems analysis and carbon balance for processes that generate liquid fuels. Loo received her PhD from Princeton University in 2001.

*Condensed matter*

**Thom Mason** is Laboratory Director of Oak Ridge National Lab. He is an experimental condensed matter physicist whose primary research tool has been neutron scattering, supplemented by the use of X-rays and transport and thermodynamic measurements. As Laboratory Director, he is responsible for a diverse portfolio of science and energy R&D spanning fundamental research in physics, biology and chemistry through climate change; energy generation, distribution and end-use; and national security programmes. Operating responsibilities include a nuclear reactor, a high-power proton accelerator, classified activities and a complex array of research facilities and construction projects.

*Space exploration*

**Mark McCaughrean** is Senior Scientific Adviser at the European Space Agency. He is responsible for communicating the scientific results from ESA's astronomy, heliophysics, planetary and fundamental physics missions. His personal research involves observational studies of the formation of stars and their planetary systems using state-of-the-art ground- and space-based telescopes. He is an Interdisciplinary Scientist on the Science Working Group for the NASA/ESA/CSA James Webb Space Telescope. He holds a PhD from the University of Edinburgh.

*Machine learning, artificial intelligence, and cognitive neuroscience*

**Tom Mitchell** is an E. Fredkin University Professor at the School of Computer Science of Carnegie Mellon University and Chair of the Machine Learning Department at CMU. Mitchell is known for his contributions to the advancement of machine learning, artificial intelligence and cognitive neuroscience, and is the author of the textbook, *Machine Learning*. He has been a member of the United States National Academy of Engineering since 2010. He is also a Fellow of the American Association for the Advancement of Science and a Fellow the Association for the Advancement of Artificial Intelligence.

*Machine learning and artificial intelligence*

**Daniel B. Neill** is Associate Professor of Information Systems at Heinz College and directs the Event and Pattern Detection Laboratory and the Joint PhD Program in Machine Learning and Policy. He received the NSF Career Award from the National Science Foundation for his work on Machine Learning and Event Detection for the Public Good. Neill's research interests include machine learning, data mining, artificial intelligence and healthcare information systems. He is particularly interested in developing methods for automatic detection and investigation of emerging events and other anomalous or interesting patterns in massive real-world datasets. Applications of this work include the very early detection of emerging outbreaks of disease, prediction of emerging patterns of violent crime, detecting anomalous patterns of patient care in a clinical setting and addressing homeland security challenges.

*Food biochemistry*

**Laura Nyström** is Assistant Professor of Food Biochemistry at ETH Zurich. Her research focuses on dietary fibres and associated phytochemicals in cereal grains and other plant materials. Her group studies the chemical and biochemical reactions that may affect these compounds with beneficial health effects on foods during processing and storage; assesses different cereals/plants as raw materials; and finds ways to improve the functionality of the components. Nyström earned an MSc and a Doctorate in Food Sciences from the University of Helsinki.

*Human-robot interaction*

**Illah R. Nourbakhsh** is Professor of Robotics at the Robotics Institute of Carnegie Mellon University. For more than 10 years, he has been exploring human-robot interaction with the aim of creating rich, effective and satisfying interactions between humans and robots. His research has focused on human-robot collaboration, wherein the robotic and human agents in the system share the same unifying goal or utility function. Most recently, he has studied the role of a research lab in meaningful design, dissemination and scaling with communities of practice. The working model combines participatory design, design-based thinking and robotic innovation to achieve positive social impact on specific problems throughout societies.

*Self-correcting organisms*

**Karen Polizzi** is a Lecturer in the Faculty of Natural Sciences of Imperial College London. The main theme of her laboratory is to detect and correct “bad behaviour” in cells using a combination of in vivo biosensors and synthetic biology. Her ultimate goal is to develop self-correcting organisms.

*In vitro meat*

**Mark Post** is Chair of Physiology and Vice-Dean of Biomedical Technology at the University of Maastricht. He first got involved in a Dutch government-funded programme investigating “in vitro meat” in 2008, when he was a Professor of Tissue Engineering at the Eindhoven University of Technology. He then led a project to create a processed meat product using muscle cells from a cow. Post received his medical degree and trained for a PhD in Pulmonary Pharmacology from the University of Utrecht.

*Artificial intelligence*

**Stuart J. Russell** is Professor of Computer Science, Director of the Center for Intelligent Systems and holder of the Smith-Zadeh Chair in Engineering at the University of California, Berkeley. He has published over 100 papers on a wide range of topics in artificial intelligence. He received a BA with first-class honours in Physics from University of Oxford in 1982 and a PhD in Computer Science from Stanford University in 1986.

*Electrochemistry*

**Donald Sadoway** is a John F. Elliott Professor of Materials Chemistry at the Massachusetts Institute of Technology. His research seeks to establish the scientific underpinnings for technologies that make efficient use of energy and natural resources in an environmentally sound manner. This spans engineering applications and the supportive fundamental science. The theme of his work is electrochemistry in nonaqueous media. Sadoway received a PhD in Chemical Metallurgy from the University of Toronto.

*Datasets and complex systems*

**Randy Sargent** is a Senior Systems Scientist at Carnegie Mellon University. He researches for the Explorables project, developing ways to interactively explore and understand large datasets and complex systems, including air and water quality, personal health, and employment and economic trends. As Visiting Scientist in Google's Earth Engine team, Sargent also helps to research and develop time-lapse explorable maps. Prior to CMU and Google, he helped develop planetary rover software in NASA Ames' Intelligent Robotics Group, and founded/co-founded two successful technology companies. Sargent has an MSc from the Massachusetts Institute of Technology Media Lab, where he developed the Programmable Brick, a research prototype for LEGO Mindstorms.

*Machine learning development*

**Aarti Singh** is an Assistant Professor in Machine Learning Development at Carnegie Mellon University. Extraction of meaningful information from big and dirty datasets requires achieving the competing goals of computational efficiency and statistical optimality. Her research goal is to understand the fundamental trade-offs between these two quantities, and design algorithms that can learn and leverage inherent structure of data in the form of clusters, graphs, subspaces and manifolds to achieve such trade-offs. Additionally, she is investigating how these trade-offs can be further improved by designing interactive algorithms that employ judicious choice of where, what and how data are acquired, stored and processed. The vision is to introduce a new paradigm of intelligent machine learning algorithms that learn continually via feedback and make high-level decisions in collaboration with humans, thus pushing the envelope of automated scientific and social discoveries.

*Mobility and independence*

**Kenneth Smith** is Senior Research Scholar and Director of the Mobility Division of the Stanford Center on Longevity at Stanford University, where he focuses on leveraging Stanford research to help individuals remain mobile and physically independent through lifestyle changes and alterations to the built environment. Smith brings a broad background of over 20 years of management and engineering experience to his role, including positions in the computing, aerospace and solar energy industries. He developed a special expertise in working closely with university faculty to develop projects while at Intel, where he was deeply involved in the creation and management of their network of university research labs. He serves on the Advisory Council for AgeTech West and holds a BSc in Mechanical Engineering from the University of Illinois with an MSc from the University of Washington.

*Mechanical engineering*

**Lydia Sohn** is Associate Professor of Mechanical Engineering at the University of California, Berkeley. Her research is focused on developing and employing quantitative techniques - from super-resolution imaging (PALM and STORM) to micro/nanofabrication technologies to high resolution genomic analysis - to analyse single cells. She is working on identifying circulating tumour cells (CTCs) in whole blood; creating a point-of-care diagnostic tool to identify acute promyelocytic leukaemia; and investigating how breast-cancer stem cells interact with their micro-environments. She is also working on an array of complex chemical and mechanical cues.

*Control engineering*
*Synthetic biology*

**Guy-Bart Stan** is Reader in Engineering Design for Synthetic Biology at the Faculty of Engineering, Department of Bioengineering of Imperial College London. He also is the Head of the Control Engineering Synthetic Biology group and an academic staff member of the Department of Bioengineering and the Centre for Synthetic Biology and Innovation. In the field of synthetic biology, he is interested in the analysis, design and control of biological systems using systems and control theory concepts. Stan is also interested in the development and application of data-based optimal control methods for the robust and optimal control of technological and biological systems, e.g. reinforcement learning algorithms applied to the design of "optimal drug scheduling" treatments for critical diseases like cancer and HIV or to the optimal control of natural or synthetic biology gene regulatory networks.

*Nutrition toxicology*

**Shana Sturla** is an Associate Professor in the Department of Health Sciences and Technology of ETH Zurich. She has also led the Laboratory of Food and Nutrition Toxicology since November 2009. The goal of her research is to understand how chemicals such as diet-derived natural products or derivatives impact disease incidence and treatment. Sturla earned a degree in Chemistry from the University of California at Berkeley and a PhD from the Massachusetts Institute of Technology. Following postdoctoral research at the University of Minnesota Cancer Center, she joined the faculty of the University of Minnesota, where she was an Assistant Professor from 2004 to 2009. She is the recipient of various awards.

*Neurological and psychiatric diseases*

**Fahmy Tarazi** is a Professor at Harvard Medical School. He has extensive experience in the pathophysiology, neuropathology and pharmacotherapy of neurological and psychiatric diseases, including Alzheimer's, schizophrenia and insomnia. Tarazi serves on the editorial board of seven biomedical and medical journals. He has received national and international awards from leading institutes and societies, and is a member of national and international societies and associations. Tarazi is involved with several start-up pharmaceutical companies and serves as a consultant for major pharmaceutical and biotechnology companies as well as venture capital firms.

*Particle physics*

**Emmanuel Tsesmelis** is Senior Physicist and Deputy Head of International Relations at the European Organization for Nuclear Research (CERN). He is an experimental particle physicist with a career spanning scientific research, academic teaching, science communication, international relations and management at CERN and at several universities. In 1998, he joined the CMS Collaboration at CERN's Large Hadron Collider (LHC), one of the two experiments that have announced the discovery of the Higgs boson.

*Materials physics*

**Ning Wang** is a Professor of Physics and Director of Materials Characterization & Preparation Facility at Hong Kong University of Science and Technology. His research interests focus on fundamental issues of materials physics, particularly 1D and 2D nanomaterials fabrication and property characterization. His representative achievements include discoveries of octagonal quasicrystals, oxide-assisted growth technology for 1D nanostructures and the world's smallest superconducting carbon nanotubes. Wang has authored/co-authored over 200 research papers and received the Chien-Shiung Wu Physics Award, State Natural Science Award and Achievement in Asia Award.

*Robotics*

**William L. Whittaker** is a Robotics Professor and Director of the Field Robotics Center at Carnegie Mellon University. He is a member of the National Academy of Engineering and a fellow of the American Association for Artificial Intelligence. Whittaker has also founded multiple companies, including Red Zone Robotics and Astrobotic Technologies, and serves as Chairman and Chief Scientist at Astrobotic. Whittaker's portfolio includes the development of computer architectures for controlling mobile robots, modelling and planning for non-repetitive tasks, complex problems of objective sensing in random and dynamic environments, and integration of complete field robot systems.

*Elastic metamaterials*

**Zhiyu Yang** is a Professor in the Physics Department of the Hong Kong University of Science and Technology, working in the area of elastic metamaterials. He invented the membrane type locally resonant metamaterials, based on which a series of novel structures and properties have been discovered. He is also the inventor of a variety of light weight, thin, highly efficient sound-proof panels/blankets and vibration dampers for buildings, trains, ships, aircraft, factories, power plants, etc. He received the inaugural Brillouin Medal (2013) from the International Phononics Society.

*Water management*

**Hong Yang** is an Expert at the World Food System Center of ETH Zurich. Her research area includes water and environmental policies, integrated analysis and modelling for decision support, water and food relations, water scarcity, food security and virtual water trade, adaptation to climate change in agricultural water management. Improving water management is the key to increasing crop yields and production, and thus food security.

*Communicable diseases*

**Lei Zhou** is Senior Investigator for the Public Health Emergency Center of the Chinese Center for Disease Control and Prevention. She has been working on communicable, respiratory and infectious diseases and avian influenza for more than 10 years. Zhou also received the Science and Technology Achievement Reward (Second Prize) of the Chinese Preventive Medicine Association.

# Pioneers and Innovators

**Michael Altendorf** ADTELLIGENCE
**Jonathan Barcant** Vetiver
**Yobie Benjamin** Avegant Corporation
**Giulio Boccaletti** Global Water at The Nature Conservancy
**Rodney Brooks** Rethink Robotics
**David Bullón Patton** Ministry of Science, Technology and Telecommunications of Costa Rica
**John Carrington** Stem
**Ron Cao** Lightspeed China Partners
**Thomas Chalberg**, Avalanche Technologies
**Eric Chen** Vitargent
**Leslie Dewan** Transatomic Power
**Sarah Doherty** TeleHealthRobotics
**Valerie Feldmann** Ogin
**Andrew Fursman** 1QB Information Technologies
**Dileep George** Vicarious
**Kunal Ghosh** Inscopix
**Anita Goel** Nanobiosym Diagnostics
**Anthony Goldbloom**, Kaggle
**Carlalberto Guglielminotti** Electro Power Systems
**Marjolein Helder** Plant-e
**Gene Lee** Avellino Lab
**Michael Lefenfeld** SiGNa Chemistry
**Rob Leslie** Sedicii
**Peggy Liu** JUCCCE
**Amit Narayan** AutoGrid
**Raphael Ouzan** Billguard
**Martin Pfeiffer** Heliatek
**Peter Platzer** Spire
**Qin Jun Tsinghua** Holding Technological Innovation
**Andreas Raptopoulos** Matternet
**Matthew L. Scullin** Alphabet Energy
**Aniruddha Sharma** Carbon Clean Solutions
**Shen Bo** Chengdu Codoon Information Technology
**Matthew Silver** Cambrian
**Gurjeet Singh** Ayasdi
**Nina Tandon** EpiBone
**Hank C. K. Wuh** TruTag Technologies
**Alex Wyatt** Climate Bridge Ventures

# Pioneers and Innovators

*eCommerce*

**Michael Altendorf** is the Chief Executive Officer and Co-Founder of ADTELLIGENCE, an eCommerce marketing technology company. He is a lecturer at several business schools and universities for internet business and entrepreneurship, including St Gallen, Mannheim, UC Berkeley, IESE, Popakademie, Furtwangen and Salzburg. Altendorf is the author of several papers on internet business models, technology and social media. He is a specialist in technology and social web innovation and monetization.

*Ecological engineering solutions*

**Jonathan Barcant** is Civil Engineer, Geotechnical and Environmental, at Vetiver in Trinidad and Tobago. He founded the company, which specializes in ecological engineering solutions for slope stabilization and erosion control, water conservation and degraded lands rehabilitation, using vegetative bioengineering tools. After establishing nurseries and beginning with small private projects, he is now engaging with the public sector for landslide rehabilitation on major coastal roads. Barcant graduated from McGill University in 2010.

*Wearable technology*

**Yobie Benjamin** is Co-Founder and Chief Operating Officer of Avegant Corporation, a virtual reality and wearable technology start-up. Benjamin's experience ranges from start-ups to mega companies. Previously, he was Global Chief Technology Officer, Global Transaction Services, Citibank; and a Partner and Chief of Global Strategy at EY. He is a Member of the Advisory Board of Intel Capital and Sierra Ventures. Benjamin seeks to push the boundaries of computer science, design and new digital experiences. Personal projects include compliant e-currencies, payments, indigenous games and re-inventing music and search.

*Water and sustainability*

**Giulio Boccaletti** is Managing Director for Global Water at The Nature Conservancy, representing over 400 scientists and practitioners working on the integration of natural capital in solving water and sustainability challenges. Previously, Boccaletti was a Partner at McKinsey & Company, where he co-founded the firm's Global Water Resource initiative and was one of the leaders of its Sustainability and Resource Productivity practice. At McKinsey, he served public and private sector institutions on issues of regulatory strategy, growth, resource economics and, more recently, water security. Before joining McKinsey, Boccaletti was a climate scientist and physical oceanographer at the Massachusetts Institute of Technology. He holds a Master's degree in Theoretical Physics from the University of Bologna, Italy, and a Master's and PhD in Atmospheric and Oceanic Sciences from Princeton University, where he was a NASA Earth Systems Science Fellow.

*Robotics*

**Rodney Brooks** is the Founder, Chairman and Chief Technical Officer of Rethink Robotics. He was elected to the National Academy of Engineering, and elected as a Fellow of the American Academy of Arts and Sciences, the Association of Computing Machinery, the Association for the Advancement of Artificial Intelligence, the Institute of Electrical and Electronics Engineers and the American Association for the Advancement of Science. Brooks speaks regularly to promote the value of robotics and artificial intelligence.

*Innovation*

**David Bullón Patton** is Director of Innovation of the Ministry of Science, Technology and Telecommunications of Costa Rica. He has a diverse background in topics that relate to innovation, with experience in scientific research at Harvard's Physics Department, and in R&D and process innovation at Black and Decker. He thrives on solving societal problems in clean water, clean energy, sustainable food and integral health. He trained as a Mechanical Engineer at Messiah College and completed a Master's in Public Administration in International Development at Harvard University.

*Energy optimization*

**John Carrington** is Chief Executive Officer of Stem, a leading provider of energy optimization services. Prior to joining Stem, he was Chief Executive Officer at MiaSole, the largest CIGS-based solar company globally. Previously, Carrington was Executive Vice-President of Marketing and Business Development at First Solar. He also spent over 16 years at General Electric, most recently as General Manager and Chief Marketing Officer, where he led global innovation, new technology efforts and product strategy for over 30,000 customers. While at GE, Carrington led innovation efforts in the healthcare, electronics, business equipment, transportation and aviation, solar, wind, defence, telecommunications, security and media sectors.

*Enterprise technology*

**Ron Cao** is Co-Founder and Managing Director of Lightspeed China Partners, a leading China-focused early-stage venture capital firm with investments in internet, mobile services and enterprise technology. Previously, Cao was Managing Director of Lightspeed Venture Partners (LSVP). Prior to joining LSVP, he was Managing Director of KLM Capital, a cross-border venture firm with offices in Silicon Valley and China, where he primarily focused on investments in early-stage technology companies. He has over 13 years of operating experience in technology companies. Cao received both his BSc and MEng degrees in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology.

*Ophthalmic disease treatment*

**Thomas Chalberg** is Founder and Chief Executive Officer of Avalanche Biotechnologies. He leads business development efforts related to in-licensing and research collaborations. Prior to joining Avalanche, Chalberg worked on the ophthalmology team at Genentech, helping to launch Lucentis, a novel therapeutic for age-related macular degeneration. As a Howard Hughes Medical Institute Fellow at Stanford, his research focused on retinal diseases and novel technologies for gene therapy. Chalberg holds a BA from Harvard University, where he graduated magna cum laude and Phi Beta Kappa. He earned a PhD in Genetics from the Stanford University School of Medicine and an MBA from the UC Berkeley Haas School of Business.

*Product testing solutions*

**Eric Chen** is Founder and Director of Vitargent, a company that aims to be a world-leading platform to provide innovative testing solutions to enhance the safety of everyday consumer products (such as food, drink and cosmetics) and to protect the environment. The company's first successful innovation is patented transgenic fish that can light up in green florescence while detecting toxins. The Government of Hong Kong has selected Vitargent as one of the six most successful high-tech companies in the last decade. Chen is an HSBC Young Entrepreneur Award (Asian) winner.

*Nuclear recycling*

**Leslie Dewan** is Chief Executive Officer of Transatomic Power, a company that is designing and developing a molten salt reactor that converts nuclear waste into electric power. In September 2013, *MIT Technology Review* recognized Dewan as one of "35 Innovators Under 35". She received BSc degrees from the Massachusetts Institute of Technology in Mechanical Engineering and Nuclear Engineering in 2007 and a PhD in nuclear engineering from the Massachusetts Institute of Technology in 2013.

*Medical care technology*

**Sarah Doherty** is Co-Founder and Chief Technology Officer of TeleHealthRobotics, a company that brings together telepresence, sensing systems and remotely controllable robotics to deliver real-time, on-demand access to medical care unconstrained by geography. Doherty has done high-tech product design and development work in the healthcare, consumer and electronic sensing spaces for Fortune 500 and start-up companies, and was previously a healthcare management consultant. She trained as a biomedical engineer at the University of Pennsylvania.

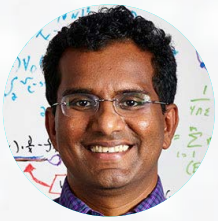
*Energy strategy*

**Valerie Feldmann** is Vice-President of Product Innovation and Strategy at Ogin. She leads the product innovation, the distinctive technology and intellectual property of the company's distributed energy solutions. She has published six books and numerous articles on technology strategy and policy. She earned a Dipl. and MA from the University of Muenster, a PhD from the Free University of Berlin and an Executive Certificate in Technology and Operations Management from the Massachusetts Institute of Technology.

*Quantum processors*

**Andrew Fursman** is Chief Executive Officer and Co-Founder of 1QB Information Technologies, a company that applies computational techniques to solve world challenges by creating software for quantum processors. Fursman studied Economics at the University of Waterloo and Philosophy and Political Science at the University of British Columbia prior to completing post-graduate programmes in Technology Studies at Singularity University and Financial Engineering at Stanford University.

*Algorithmic architectures*



**Dileep George** is Co-Founder and Chief Technology Officer of Vicarious, a company that builds unified algorithmic architectures to achieve human-level intelligence in vision, language and motor control. He has authored 22 patents and several influential papers on the mathematics of brain circuits. His research on hierarchical models of the brain led to his PhD in Electrical Engineering from Stanford University. He also holds an MSc in Electrical Engineering from Stanford University.

*Data analytics*

**Kunal Ghosh** is Founder and Chief Executive Officer of Inscopix, a company that offers solutions combining cutting-edge instrumentation and powerful data analytics with scientific workshops and rigorous online education to empower researchers to make breakthrough discoveries. Prior to founding Inscopix, Ghosh was a Postdoctoral Scholar in the Department of Biology at Stanford. He received his MSc and PhD, both in Electrical Engineering, from Stanford in 2006 and 2010, respectively.

*Nanobiosym diagnostics*

**Anita Goel** is Founder, Chairman and Chief Executive Officer of Nanobiosym Diagnostics, an R&D innovation engine and hi-tech incubator at the convergence of physics, nanotechnology and biomedicine. Over the past 15 years, her pioneering contributions to this interface have been recognized globally by prestigious honours and awards. She established Nanobiosym Diagnostics to commercialize the Gene-RADAR technology platform to empower people worldwide with rapid, accurate and portable diagnostic devices. A Harvard-MIT trained physicist and physician, Goel was named as one of the world's "35 Innovators under 35" by *MIT Technology Review*.

*Data crowd-sourcing*

**Anthony Goldbloom** is Founder and Chief Executive Officer of Kaggle, a company that crowd-sources heavy data for companies. He was twice named by *Forbes* as one of the 30 under 30 in Technology, and the *MIT Technology Review* has named him as one of the "35 Innovators Under 35". He holds an Alumni of Distinction Award from Melbourne University.

*Energy storage*

**Carlalberto Guglielminotti** is Chief Executive Officer of Electro Power Systems, a forerunner in smart hydrogen-based systems for energy storage. He is an entrepreneur focusing in the hi-tech, energy and digital sectors, with a strong expertise in start-up, growing-stage companies and turn-arounds.

*Bio energy*

**Marjolein Helder** is Chief Executive Officer of Plant-e, a company that uses electrodes to harvest electricity from live plants grown in a bed of activated carbon and water. Helder graduated as an Environmental Technologist, after which she earned a PhD at the sub-department of Environmental Technology of Wageningen University on a technology to produce electricity from living plants.

*Avellino Corneal Dystrophy*

**Gene Lee** is Founder and Chief Executive Officer of Avellino Lab, a company specializing in the genetic mapping of the human genome, and more specifically in the commercial genetic testing for Avellino Corneal Dystrophy. Lee commercialized a rapid and inexpensive screening system to protect people from blindness while providing information to patients carrying the ACD gene mutation. He has more than 20 years of experience leading pharmaceutical, healthcare and genetic diagnostics teams.

*Stabilized metal*

**Michael Lefenfeld** is President and Chief Executive Officer of SiGNa Chemistry, a company that develops new stabilized reactive metal technology. Lefenfeld is a materials chemist, a scientist and an entrepreneur. He has devoted his career to making industries safer and products greener, leading to safer work environments, better medical technologies and the development of new alternative energy solutions. He is an originator of SiGNa's cornerstone stabilized reactive metal technology and is driving SiGNa's effort to make clean energy a viable alternative around the world.

*Internet security*

**Rob Leslie** is Chief Executive Officer and Founder of Sedicii, a company that solves the problem of internet password overload by eliminating the need for passwords to be transmitted or stored anywhere except in the user's head, thus increasing the security of a person's online identity. He is also an investor in various start-up companies in technology and biomed.

*Sustainable environmental solutions*

**Peggy Liu** is Chairperson of JUCCCE, a non-profit organization for accelerating the greening of China, and an expert in China's clean energy landscape. Liu is an executive adviser to Marks & Spencer on sustainable retailing and she has been an energy adviser to the Clinton Global Initiative. Liu is a Time Magazine Hero of the Environment, the Hillary Step, Forbes "Women to Watch in Asia", Global Times "Green Goddess" and one of China Business News Weekly's top 25 innovative business leaders. In the 1990s, she held various executive positions at software companies in Silicon Valley and was recognized as an Internet pioneer heading Channel A, one of the earliest e-commerce companies. She holds a BSc from MIT in Electrical Engineering and Computer Science.

*Energy data platform*

**Amit Narayan** is Founder and Chief Executive Officer of AutoGrid, an energy data platform. From 2010 to 2012, he was the Director of Smart Grid Research in Modelling and Simulation at Stanford University, where he continues to lead an interdisciplinary project related to modelling, optimization and control of the electricity grid and associated electricity markets. Over one-third of all semiconductor chips used in consumer electronic devices were designed using products developed by Narayan's team at Magma. Narayan received the EDN's Innovation for the Year award in 2006. He received his BTech in Electrical Engineering from the Indian Institute of Technology at Kanpur and PhD from the University of California at Berkeley.

*Data control*

**Raphael Ouzan** is Founder and Chief Technology Officer of BillGuard, a company that developed an advanced identity-theft protection technology based on consumer bills. In the past, he established and managed super hacker teams as an officer in Israel's elite military intelligence unit. He designed and built massively scalable and secure intelligent data systems that have become standards, earning the unit's highest honour as well as the President's Award for outstanding achievements. Ouzan started creating software professionally at age 13.

*Organic photovoltaic solar cells*

**Martin Pfeiffer** is Founder and Chief Technology Officer of Heliatek, a company that develops and produces organic photovoltaic solar cells, leveraging organic materials to improve the cost-efficiency characteristics of solar cells for large area applications. Heliatek is developing a new proprietary material that displays unprecedented power efficiency, transport and contact properties as well as extended lifetime characteristics. Pfeiffer is an internationally recognized expert in organic semiconductor technology and holds a PhD from Dresden University of Technology.

*Satellites*

**Peter Platzer** is Chief Executive Officer of Spire. He co-founded the company in 2012 with a vision to provide satellite-powered data from any location on Earth. Platzer is regarded as one of the pioneers in launching small form factor satellites into space. He has been widely recognized for his visionary leadership and was named a White House Champion of Change in 2013. Prior to launching Spire, Platzer trained at CERN and the Max Planck Institute. He graduated with a MSS from the International Space University, received a MSc in Physics from the Technical University of Vienna and an MBA from Harvard, where he was a Baker Scholar.

*Entrepreneurial ecosphere*

**Qin Jun** is Chairman of Tsinghua Holding Technological Innovation. She has been devoted for 15 years to regional innovation and entrepreneurial incubation, the construction and operation of a local science park, and creatively exploring the development of ecological industry systems as well as entrepreneurial ecosphere. She previously worked as assessor of incubators for state science enterprises and entrepreneurial talent platforms.

*Unmanned aerial vehicles*

**Andreas Raptopoulos** is Founder and Chief Executive Officer of Matternet, a Silicon Valley start-up launching a new paradigm of transportation using networks of small unmanned aerial vehicles (UAVs). This new mode for transportation will be the most energy-efficient way for last-mile delivery of small packages in the cities of the future and remote rural areas, especially where road networks are not well-developed. Raptopoulos holds a diploma in Mechanical Engineering and Aeronautics from the University of Patras, a diploma from Imperial College London in Industrial Design Engineering and a Master of Arts from the Royal College of Art.

*Thermoelectrics*

**Matthew L. Scullin** is the Chief Executive Officer of Alphabet Energy. He has nearly a decade of experience in thermoelectrics and is one of the industry's top experts. Scullin is a thought leader in waste-heat recovery and energy efficiency. He is the holder of 12 patents issued and pending, and author of more than a dozen peer-reviewed papers and conference proceedings. In 2012, Scullin was named as one of the Forbes 30 Under 30. He holds a PhD in Materials Science from the University of California at Berkeley.

*Carbon capture technology*

**Aniruddha Sharma** is Co-Founder and Chief Executive Officer of Carbon Clean Solutions, a company that specializes in developing low-cost, energy-efficient carbon capture technology to lead to a carbon-free future. Sharma was nominated as one of the Top 50 Brightest Young Climate Leaders. He holds a Master's degree in Statistics from the Indian Institute of Technology of Kharagpur.

*Wellness solutions*

**Shen Bo** is Founder and Chief Executive Officer of Chengdu Codoon Information Technology, a Chinese company that provides sports and wellness services through software and hardware solutions, in particular wristbands. Prior to that, he was engaged in technology research and development at Nokia, Siemens, Cisco and more. Shen holds a Master's in Computer Science from the University of Electronic Science and Technology of China.

*Biotechnology*

**Matthew Silver** is Founder and Chief Executive Officer of Cambrian, with over 14 years of experience in technology commercialization, innovation strategy and engineering design. Previously, Silver co-founded Intelligent Action, a Massachusetts Institute of Technology spin-out providing strategic decision-making capabilities. Silver has published more than 15 academic publications and, in 2011, testified before the United States Senate on the government's role in early stage innovation. As a research scientist at the MIT Space Systems Lab and system engineer at the Canadian Space Agency, Silver participated in two field expeditions to the High Canadian Arctic to operate and test exploration systems in extreme environments. He was a finalist candidate for the NASA Astronaut Corp (final 48 out of 6,300+ applicants). Silver has a PhD from MIT in Engineering Systems and two Master's degrees from MIT in Aerospace Engineering and Technology and Policy.

*Machine intelligence*

**Gurjeet Singh** is Chief Executive Officer and Co-Founder of Ayasdi, a machine intelligence company. He leads a technology movement that emphasizes the importance of extracting insight from data, not just storing and organizing it. Singh developed key mathematical and machine learning algorithms for topological data analysis (TDA) and their applications during his tenure as graduate student in Stanford's Mathematics Department. Singh was named by the *Silicon Valley Business Journal* as one of their 40 Under 40 in 2015. He holds a BTech from Delhi University, and a PhD in Computational Mathematics from Stanford University.

*Bone reconstruction*

**Nina Tandon** is Chief Executive Officer and President of EpiBone, a revolutionary bone reconstruction company that allows patients to "grow their own bone" without the complications of foreign body implantation. She is a Senior Fellow, Adjunct Professor of Electrical Engineering at the Cooper Union and was a Staff Associate Postdoctoral Researcher in the Laboratory for Stem Cells and Tissue Engineering at Columbia University. She earned a PhD and MSc in Biomedical Engineering from Columbia University.

*Anti-counterfeiting data*

**Hank C. K. Wuh** is Chairman of TruTag Technologies, a data-rich security platform for the authentication and anti-counterfeiting of food, medicine and industrial components. He is also a surgeon, inventor and entrepreneur. He has led the development of over 20 biomedical innovations. He was the Chief Executive Officer of SKAI Ventures, a global venture accelerator focused on transforming ideas into disruptive technologies; and Chairman of Eyegenix, developing an artificial cornea to treat blindness. He received his MD from Johns Hopkins University and specialized in Orthopaedic Surgery at Stanford University.

*Low-carbon technologies*

**Alex Wyatt** is Director of Climate Bridge Ventures, an international group of companies devoted to the deployment of low-carbon technologies in China and throughout the developing world. Climate Bridge's projects span a broad range of technologies, including hydroelectricity, wind, biomass, solar, biogas, waste heat capture and other forms of energy efficiency.

# Young Scientists

*Awarded outstanding researchers under the age of 40*

**Erez Aiden** Baylor College of Medicine
**Adam Abate** University of California, San Francisco
**Andrea Armani** University of Southern California
**Inês Azevedo** Carnegie Mellon University
**Noble Banadda** Makerere University
**Michael Bronstein** University of Lugano
**Adrien Desjardins** University College London
**Mikael Ehn** University of Helsinki
**Amit Etkin** Stanford University
**Teng Fangfang** Dalian Fossil Museum
**Wang Feng** Dalian Institute of Chemical Physics
**Ivana Gadjanski** Belgrade Metropolitan University
**Ali Hilal-Alnaqbi** UAE University
**Mande Holford** Hunter College
**Mark Howarth** University of Oxford
**Xianmin Jin** Shanghai Jiao Tong University
**Sohini Kar-Narayan** University of Cambridge
**Rob Knight** University of Colorado
**Yan Lan** Dalian Shinergy
**Lee Seung-Hee** Korea Advanced Institute of Science and Technology
**Jia Li Imperial** College London
**Jackson Mohlopheni Marakalala** Harvard Medical School
**Louis-Philippe Morency** Carnegie Mellon University
**Vanny Narita** National Innovation Committee of the Republic of Indonesia
**Vidushi Neergheen-Bhujun** University of Mauritius
**Tolu Oni** University of Cape Town
**Victor M. Panaretos** Ecole Polytechnique Fédérale de Lausanne (EPFL)
**Yin Peng** Harvard Medical School
**Panayiota Poirazi** Molecular Biology and Biotechnology of Greece
**Shi Qihui** Shanghai Jiao Tong University
**Amanda Randles** Duke University
**Jennifer Rupp** ETH Zurich
**Ozgur Sahin** Columbia University
**Anna Scaife** University of Southampton
**Björn Schuller** Imperial College London
**Fabio Sciarrino** Sapienza University
**Tracy Robyn Slatyer** Massachusetts Institute of Technology
**Christoph Stampfer** RWTH Aachen University
**Sriram Subramanian** University of Sussex
**Kirill Veselkov** Imperial College London
**Saul A. Villeda** University of California, San Francisco
**Dao Xiang** Shanghai Jiao Tong University
**Kyoungsik Yu** Korea Advanced Institute of Science and Technology
**Zeng Qingcheng** Dalian Maritime University
**Weian Zhao** University of California, Irvine

# Young Scientists

*Applied mathematics*

**Erez Aiden** is an Assistant Professor in the Department of Genetics at the Baylor College of Medicine, where he directs the Center for Genome Architecture, and in the Department of Computer Science and Computational and Applied Mathematics at Rice University. His research has made fundamental contributions to a large variety of disciplines, including molecular biology, polymer physics, historical linguistics, wearable computing, and mathematics. These include: development of a three-dimensional genome sequencing method; discovery of dynamic reorganization of the genomic architecture to facilitate gene expression or silencing; the characterization of the genome as a "fractal globule;" quantitative analysis of the evolutionary dynamics of language which led to the discovery that the rate of verb regularization depends on the inverse-square of its usage frequency. He has over 20 patents in various stages of filing. Co-inventors include Bob Langer, Nathan Myhrvold and Bill Gates.

*Microfluidic methods*

**Adam Abate** is Assistant Professor in Bioengineering at the School of Pharmacy of the University of California at San Francisco. He is a physicist whose research employs microfluidics for high-throughput biological applications. He has developed microfluidic methods to create emulsions that consist of droplets of very precise and consistent sizes that are used to create micro-compartments, which can be loaded with single cells and other active materials, such as drugs, nutrients, and assay reagents. The droplets can be used as tiny "test tubes" for performing chemical and biological reactions. This approach is used for directed evolution, genetic sequencing and cell sorting.

*Optical sensors*

**Andrea Armani** is the Fluor Early Career Chair in Engineering and Associate Professor of Chemical Engineering and Materials Science at the University of Southern California. Armani is the recipient of several awards, including the Office of Naval Research Young Investigator Award, the Presidential Early Career Award for Scientists and Engineers, and NIH Director's New Innovator Award. She has a Bachelor's in Physics from the University of Chicago and a PhD in Applied Physics from the California Institute of Technology.

*Adapting sustainable energy systems*

**Inês Azevedo** is Associate Professor in the Department of Engineering and Public Policy at Carnegie Mellon University, and Co-Director of the Climate and Energy Decision Making Center. Her research interests lie at the intersection of environmental, technical and economic issues, such as how to address the challenge of climate change and move towards a more sustainable energy system. Azevedo is author of numerous peer-reviewed journal publications and co-author of two reports from the National Research Council. She received the Early Career Award from the Dean of the Carnegie Institute of Technology. Azevedo has a BSc in Environmental Engineering, a MSc in Engineering Policy and Management of Technology from the Technical University of Lisbon, and a PhD in Engineering and Public Policy from Carnegie Mellon University.

*Bioremediation and waste water management*

**Noble Banadda** is Professor and Chair of the Department of Agricultural and Bio Systems Engineering at Makerere University in Uganda. He has field experience in design and operation of wastewater-activated sludge systems, anaerobic digestion of wastewaters and sludges, and bioremediation processes of soils, as well as experience in various aspects of mathematical modelling of bioprocesses, food processing engineering and biosystems. Banadda received a BSc in Food Science and Technology from the Sokoine University of Agriculture in Tanzania, an MSc in Processing Engineering and PhD in Chemical Engineering. He was also a Cochran Fellow at the Massachusetts Institute of Technology.

*Machine vision*

**Michael Bronstein** is an Assistant Professor at the Institute of Computational Science in the Faculty of Informatics at the University of Lugano in Switzerland. He also serves as a research scientist at Intel. Bronstein's research interests include geometric methods in computer vision, pattern recognition and computer graphics. He has worked on 3D data acquisition and processing, which was the technological core of the Israeli start-up Invision to develop a low-cost 3D sensor. Bronstein has authored over 70 publications in leading journals and conferences, over a dozen of patents and the book "Numerical geometry of non-rigid shapes". His research was recognized by numerous awards and was featured in CNN, SIAM News and Wired. Bronstein received his PhD from the Technion.

*Medical devices and imaging systems*

**Adrien Desjardins** is a Senior Research Fellow and Lecturer in Medical Physics and Biomedical Engineering at UCL. His research is centred on the development of medical devices and imaging systems. He joined the Department of Medical Physics and Bioengineering at UCL as a Lecturer in March 2011 and founded the Interventional Devices Group (IDG) within the department to initiate a wide-ranging translational research programme that spans physics, engineering and medicine. His vision is to transform minimally invasive procedures with novel medical devices that actively sense and respond to their environment, and novel imaging systems that can interact directly with the medical devices. The IDG collaborates closely with physicians in the UK and elsewhere to achieve its goal of improving clinical outcomes for patients.

*Organic particles*

**Mikael Ehn** is Researcher in the Department of Physics of the University of Helsinki. The goal of his five-year project is to better understand the generation, evolution and life-cycle of organic particles in the atmosphere. He studies how compounds generated by nature and human action evaporate into the atmosphere. His research seeks to describe organic particles in a completely new way, using the latest mass spectrometry technology.

*Emotional disorders*

**Amit Etkin** is Assistant Professor of Psychiatry and Behavioral Science at Stanford University. The aim of the Etkin lab is to understand the neural basis of emotional disorders and their treatment, and to leverage this knowledge to develop novel treatment interventions. Etkin also directs a new initiative of the Stanford Neurosciences Institute called NeuroCircuit, which brings together neuroscientists, engineers, psychologists, physicians and others to establish a new intellectual, scientific and clinical paradigm for understanding and manipulating human brain circuits in healthy individuals and for treating psychiatric disease.

*Palaeontology*

**Teng Fangfang** is Director of the Dalian Fossil Museum. She is an outstanding palaeontologist, museum curator and entrepreneur. She actively participates in popular science education, scientific research and scientific construction work. She has participated in digs and fossil research with the American, Canadian and Chinese academies of geological sciences. She has discovered many new species of birds, dinosaurs and reptiles. She founded the Dalian Xinghai Fossil Museum in 2011.

*Bioenergy*

**Wang Feng** is Deputy Director of the Division of Bioenergy at the Dalian Institute of Chemical Physics. He focuses on the development and utilization of biomass energy in the context of the petrochemical industry. Feng is also a Member of the Chinese Academy of Sciences.

*Stem cells, tissue engineering and 3D bioprinting*

**Ivana Gadjanski** is an Assistant Professor at Belgrade Metropolitan University, with research interests in the field of stem cells and tissue engineering. She is the Founder of Pubsonic, a biomedical search engine start-up, and the Fab initiative, a non-profit that supports entrepreneurship in the STEAM field in Serbia and the Western Balkans. She also established Serbia's first Fab Lab, a workshop for rapid prototyping and a 3D bioprinting facility at the R&D Center for Bioengineering. Gadjanski has been a Fulbright and TED Fellow and a Member of the Global Young Academy. She earned a PhD in Neuroscience in Germany.

*Bioreactors*

**Ali Hilal-Alnaqbi** is Associate Professor in Mechanical Engineering at UAE University where he has teaching bio-instrumentation, biomechanics, engineering economy, marketing and product development, bio-engineering and capstone. His research focuses on bioreactors, tissue mechanics, membranes and polymers, 3D culturing including micro carriers and collagen matrix, nano particles and modelling. Hilal-Alnaqbi is particularly interested in the 3D environment for cells growth enhancement, design and assembly of best bioreactor configuration. He has two patents in the UK and US for serviceable bioreactors.

*Drug discovery and science diplomacy*

**Mande Holford** is an Assistant Professor of Chemical Biology at Hunter College in New York. Her research combines chemistry and biology to discover, characterize and deliver novel neuropeptides from venomous marine snails as tools for manipulating cell signalling in the nervous system. She is actively involved in science education, advancing the public understanding of science and science policy. She has a scientific appointment at the American Museum of Natural History. Holford is a Member of the American Association for the Advancement of Science (AAAS), American Chemical Society, American Peptide Society and New York Academy of Sciences. She earned her PhD at Rockefeller University.

*Bionanotechnology*

**Mark Howarth** is Associate Professor in Bionanotechnology at the University of Oxford. Bionanotechnology involves manipulating and modifying components of living organisms to generate tools on the 1-100 nanometre scale with new desirable activities. Inspired by extraordinary molecular features from the natural world, his research develops new biological and chemical approaches for disease diagnosis and fundamental insight into how cells function.

*Quantum integrated photonics*

**Xianmin Jin** is Professor and Founder of the Laboratory of Quantum Integrated Photonics at Shanghai Jiao Tong University. He is developing quantum integrated photonics, an elegant way to find a solution to the limitation of computational power of human beings. He is also leading a project on developing an on-chip quantum terminal, which would facilitate quantum communication that ensures the unconditional security of private communication for the first time.

*Electrocaloric effect*

**Sohini Kar-Narayan** is Lecturer in the Department of Materials Science & Metallurgy at the University of Cambridge. Her research within the Device Materials Group aims at developing an efficient and clean solid-state cooling technology based on the electrocaloric (EC) effect associated with phase transitions in ferro-electric materials. Her interest lies in the development and understanding of new EC materials and the subsequent design of prototype cooling devices. She received her PhD from the Indian Institute of Science.

*Human microbiome*

**Rob Knight** is Associate Professor of Chemistry and Biochemistry and Assistant Professor of Computer Science at the University of Colorado, Boulder, and Assistant Professor in the Computational Biosciences Program at the University of Colorado, Denver. He is integrating concepts from evolutionary biology and ecology with high-throughput sequencing to study molecular diversity. He is especially interested in understanding how the human microbiome develops and how variation in the microbiome affects health and disease. Knight's lab focuses on genomics, molecular evolution and the microbiome. Advances in high-throughput sequencing and computational techniques allow the lab to address large-scale questions about evolution that have never before been accessible. Its research combines computational and experimental techniques to ask questions about the evolution of the composition of biomolecules, genomes and communities. The three focus areas are: community composition and the human microbiome; RNA composition; and new bioinformatics tool development.

*Wind power*

**Yan Lan** is General Manager of Dalian Shinergy. He has been working in the wind power industry for almost 20 years and is China's first chief engineer to lead the localization of megawatt-level wind turbines. Under his leadership, his team was the first in China to obtain certification by the State Grid Power Science Institute New National Standard and break the monopoly of overseas technology. Lan graduated from Zhejiang University, earning a BA, MA and PhD.

*Brain circuits*

**Lee Seung-Hee** is Assistant Professor of Neuroscience at the Korea Advanced Institute of Science and Technology, where she leads a research group to unravel brain circuits that are critical for dynamic modulation and processing of sensory information in the brain. She also established an independent research programme and focuses on molecular, cellular and behavioural neuroscience. Her work has been recognized and presented in many well-known international conferences.

*Transgenomic metabolic interaction*

**Jia Li** is Lecturer in Human Development and Microbial Signalling at Imperial College London. Her research focuses on the mechanisms of weight-loss surgery, host-microbial communication in health and disease, host-parasite metabolic interactions and metabolomics in plants and traditional herbal medicine. She has received a number of awards including Imperial College Junior Research Fellowship, Deputy Rector's Award and the Wang-Kuan-Cheng Research Fellowship. She is a member of the Royal Society of Chemistry and American Society for Microbiology. She holds a PhD in biochemistry and metabonomics from Imperial College London.

*Tuberculosis*

**Jackson Mohlopheni Marakalala** is postdoctoral Researcher in Biochemistry at Harvard Medical School. His research focuses on molecules than can inhibit growth of TB-causing bacteria by targeting particular genes of the bacteria. He holds a BSc in Biochemistry and Microbiology from the University of Limpopo and a PhD from the University of Cape Town.

*Human behaviour analysis*

**Louis-Philippe Morency** is Assistant Professor at the Language Technology Institute's School of Computer Science of Carnegie Mellon University. His research focuses on building the computational foundations to enable computers to analyse, recognize and predict subtle human communicative behaviours during social interactions. He addresses four key computational challenges: behavioural dynamic, multimodal dynamic, interpersonal dynamic and societal dynamic. This multidisciplinary research topic overlaps the fields of multimodal interaction, social psychology, computer vision, machine learning and artificial intelligence, and has applications in areas as diverse as medicine, robotics and education.

*Science policy and cellular biology*

**Vanny Narita** is an Innovation Program Specialist at the National Innovation Committee of the Republic of Indonesia. She is also a Researcher at the Agency of the Advancement and Application of Technology. Her research focuses on valuable recombinant protein expression, working closely with industries within Indonesia's Vaccine and Medicine Consortium. Narita is the National Contact Point for Health for Horizon 2020-EU. She is a Member of the Global Young Academy.

*Drug discovery and regulatory policy*

**Vidushi Neergheen-Bhujun** is a Senior Lecturer at the University of Mauritius, specializing in applied biochemistry and pharmacognosy. This includes basic research and clinical trials to determine health-promoting and disease management potential of traditional herbal, endemic medicinal and food plants against several non- communicable diseases. She is also interested in assisting the development of national policies and programmes for the regulation of herbal medicine and functional food in Mauritius. Neergheen-Bhujun is a Member of the Global Young Academy, with executive positions in 2012 and 2013. She also leads the secretariat of the Society for Free Radical Research Africa. Neergheen-Bhujun has a PhD in Biosciences from the University of Mauritius.

*Epidemiology and TB*

**Tolu Oni** is Senior Lecturer in the Division of Public Health Medicine of the School of Public Health at the University of Cape Town. Her research focuses on epidemiology, TB diagnostics, treatment, co-infections and associated diseases, as well as changing patterns of diseases in Africa. She holds a Doctoral degree (MD Res) in Epidemiology from Imperial College London, a Master's in Public Health from the University of Cape Town and a BSc in International Health from University College London.

*Mathematical statistics applied to the natural sciences*

**Victor M. Panaretos** is Associate Professor of Mathematical Statistics at Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, where he leads a group of eight researchers developing mathematical statistics for complex data structures. At the age of 24, he became the youngest faculty member ever to hold a chaired professorship at EPFL and then one of the youngest ever ERC Starting Grant Awardees. Panaretos is the recipient of the Erich Lehmann Award for an Outstanding Doctoral Thesis in Theoretical Statistics. He has a PhD from the University of California, Berkeley.

*Self-assembly of DNA*

**Yin Peng** is an Assistant Professor in Systems Biology at Harvard Medical School and a Faculty Member of the Wyss Institute for Biologically Inspired Engineering at Harvard University. His research interests lie at the interface of information science, molecular engineering and biology. His current focus is to engineer information directed self-assembly of nucleic acid (DNA/RNA) structures and devices, and to exploit such systems to do useful molecular work. Yin is the recipient of several awards, including: NIH Director's New Innovator Award (2010); NSF CAREER Award (2011); DARPA Young Faculty Award (2011); ONR Young Investigator Program Award (2011); NIH Director's Transformative Research Award (2013); NSF Expedition in Computing Award (2013); and ACS Synthetic Biology Young Scientist Award (2014).

*Molecular biology*

**Panayiota Poirazi** is a Research Director at the Institute of Molecular Biology and Biotechnology of the Foundation for Research and Technology-Hellas in Greece. Her lab studies brain functions related to learning, memory and neural computations via the use of computational models. She is a recipient of an EMBO Young Investigator award and of the "Manolis Christofides" Young Cypriot Investigator award. She is a member of the Young Academy of Europe and Chair of the FENS-Kavli Network of Excellence, whose aim is to promote neuroscience research and science policy in Europe and beyond. She holds a Bachelor's degree in Mathematics from the University of Cyprus and Master's and PhD in Biomedical Engineering from the University of Southern California.

*Protein profiling*

**Shi Qihui** is Professor at the Shanghai Center for Systems Biomedicine and School of Biomedical Engineering of Shanghai Jiao Tong University. He has developed automatic, microfluidic-based single-cell proteomic chips (SCPCs) for quantitatively profiling tens of proteins associated with multiple signal transduction pathways in single tumour or immune cells. He was a Postdoctoral Research Fellow at the California Institute of Technology.

*Large-scale applications*

**Amanda Randles** is Assistant Professor in Biomedical Engineering at Duke University. Her work focuses on the design of large-scale parallel applications targeting problems in physics. Her research goals are to investigate fundamental questions related to fluid dynamics and to extend the multiscale models developed in her thesis to study cancer metastasis. She designs large-scale parallel applications that enable the study of research problems in areas ranging from cardiovascular disease and wireless networks to drug development.

*New materials science and energy storage systems*

**Jennifer Rupp** is Head of the Department of Materials at ETH Zurich in Switzerland. Her main research interests are on materials development and structure-transport relations for information memory storage, microsystems and energy conversion and storage systems. This includes new device design concepts and performance testing. Rupp is an elected member of the European Academy of Science for Chemistry and on the editorial board of the Journal of Electroceramics. She is the winner of the Spark Award 2014 by ETH Zurich for the most innovative and economically important invention of the year for a new memristor information storage concept. Rupp studied mineralogy and crystallography at the University of Vienna in Austria and received her PhD in Material Science from ETH Zurich.

*Biological systems*

**Ozgur Sahin** is Associate Professor in the Department of Biological Sciences and Department of Physics at Columbia University. His research investigates biological systems that function under physical extremes like short timescales, confinement to nanoscale regions of space and high mechanical forces. He encounters interesting phenomena in these biological systems that he applies to medical, environmental and energy related problems.

*Radio astronomy and cosmic magnetic fields*

**Anna Scaife** is a Reader at the School of Physics and Astronomy at the University of Southampton in the United Kingdom. Her research includes pioneering work in the study of galaxy stability and evolution through radio astronomy which allows for the observation of cosmic-ray electrons and magnetic fields invisible to optical telescopes. Her research is laying the ground work for understanding how cosmic magnetic fields are generated and for experiments planned for the Square Kilometre Array.

*Speech processing technology*

**Björn Schuller** is a Senior Lecturer in Machine Learning at Imperial College London and Chair of Complex and Intelligent Systems at the University of Passau. His project focuses on speech processing technology. He uses novel techniques for multi-task and semi-supervised learning to deliver for the first time intelligent holistic and evolving analysis in real-life condition of universal speaker characteristics. Today's sparseness of annotated realistic speech data will be overcome by large-scale speech and metadata mining from public sources such as social media, crowdsourcing for labelling and quality control, and shared semi-automatic annotation.

*Quantum information protocols*

**Fabio Sciarrino** is Associate Professor in the Physics Department at Sapienza University. His research has been devoted mainly to the experimental realization of quantum information protocols by exploiting the methods of quantum optics. To achieve his results has required the development of innovative experimental techniques based on non-linear optics, ultra-fast lasers and detection methods, as well as of new theoretical insights. The results of his investigations have advanced the experimental techniques of quantum optics and contributed to understanding some conceptual aspects of the foundations of quantum mechanics and quantum information theory.

*Particle physics, cosmology and astrophysics*

**Tracy Robyn Slatyer** is Assistant Professor in the Physics Department of the Massachusetts Institute of Technology. She is a theoretical physicist who works on particle physics, cosmology and astrophysics. Her research interests are motivated by key particle physics questions, such as the search for new particles and forces and a microscopic description of dark matter, but she seeks answers to these questions by analysing astrophysical data, including gamma-rays, X-rays, radio and the CMB. Slatyer has proposed a new kind of dark matter particle that accounts for the measured excess of cosmic ray positrons that could be due to dark matter annihilation. Included in her work was a major contribution to high–energy astrophysics that showed that the gamma ray "haze" seen by the Fermi Gamma Ray Space Telescope is, in fact, emission from two hot bubbles of relativistic plasma emanating from the galactic centre. She has done similarly creative work combining particle physics modelling with cosmological N-body simulations and calculations of ionization during the cosmic dark ages, and its effects on the cosmic microwave background.

*Graphene quantum electromechanical systems*

**Christoph Stampfer** is a Professor in the Department of Physics and Head of the Second Institute of Physics A at RWTH Aachen University in Germany. His research interests include the fields of microelectronics and nanotechnology, with a particular focus on carbon based microelectronics. Stampfer has authored and co-authored more than 100 papers for Nature Physics, Nano Letters, Physical Review Letters and Applied Physics Letters, among others. He is the recipient of an ERC Starting Grant to work on graphene quantum electromechanical systems. Stampfer earned a BSc in Applied Physics from the University of Edinburgh and a PhD from the ETH Zürich in Switzerland.

*Human-computer interaction*

**Sriram Subramanian** is a Professor of Informatics at the University of Sussex in the United Kingdom. His research focuses on expanding the possibilities of user experiences when interacting with computer-mediated environments through the use of haptics, visual and smell modalities. Subramanian is also Co-Founder of Ultrahaptics, which brings back the sense of (tactile) touch to touchless interfaces, creating the experience of feeling without touching. Prior to Sussex he was a Professor at Bristol University and a Senior Scientist at Philips Research Eindhoven in the Netherlands. Subramanian has an undergraduate degree in physics, an ME in Electrical Communication Engineering and a PhD in Industrial Design.

*Computational medicine*

**Kirill Veselkov** is Lecturer in Computational Medicine at Imperial College London. He is internationally recognized for his expertise in computational medicine and is committed to developing and validating translational computational solutions for application in human disease personalization. The techniques developed by Veselkov and his team could have major implications for next generation cancer diagnostic, prognostic and therapeutic approaches. Veselkov has published over 30 articles in high-impact journals.

*Brain ageing*

**Saul A. Villeda** is a Sandler Faculty Fellow and Principal Investigator of the Villeda Lab at the Eli and Edythe Broad Center of Regeneration Medicine and Stem Cell Research of the University of California, San Francisco. He investigates the cellular and molecular mechanisms that contribute to brain ageing, as well as those that promote the rejuvenation of the old brain. The goal of his work is to better understand how to ameliorate age-related cognitive dysfunction by harnessing the latent plasticity remaining within the old brain.

*Particle accelerator physics*

**Dao Xiang** is Professor of Physics at Shanghai Jiao Tong University. He changed his research area from free-electron laser to ultrafast electron diffraction and microscopy after realizing that these new facilities could offer many opportunities in ultrafast science that may make a big impact in improving the state of the world. He is an internationally recognized expert and leader in particle accelerator physics and ultrafast science researches. He has made many important original contributions that have significantly impacted the development of particle accelerators.

*Optoelectronics*

**Kyoungsik Yu** is Associate Professor at the School of Electrical Engineering of the Korea Advanced Institute of Science and Technology. He focuses on the area of integrated optoelectronic devices and systems for generation, manipulation and acquisition of optical and electromagnetic signals. His research is meant to enable innovations in many aspects of information technologies. He has published more than 100 peer-reviewed articles in journals and conference proceedings. Yu is the recipient of the 2015 Joint Award for young IT engineers selected by the Institute of Electronics and Information Engineers and the Institute of Electrical and Electronics Engineers.

*Maritime operations*

**Zeng Qingcheng** is Professor at the School of Transportation Management at Dalian Maritime University. His research interests include maritime operation and management, supply chain and management, and port and shipping management. He also collaborates with scholars in America, Canada and Denmark in the areas of dry port operation, maritime security and port operation. He serves as a lecturer for training programmes for senior managers of ports and shipping companies. He is the author of many papers.

*Stem cells and devices*

**Weian Zhao** is Assistant Professor of Pharmaceutical Sciences at the University of California, Irvine. His research aims to elucidate and eventually control the fate of transplanted stem cells and to develop novel miniaturized devices for disease diagnosis and monitoring. Zhao's sensor will allow scientists to immediately observe what the drug does inside animals, which can help speed a promising drug towards human trials. He is also working towards binding stem-cell-based sensors to various cancer markers in the hope of developing a faster, less expensive and potentially more accurate diagnostic tool that could in many cases eliminate the need for a biopsy.

# Related Communities

In addition to the distinguished innovators who shape the Science and Technology agenda at the Annual Meeting of the New Champions, much of the interaction is tied to Forum communities, which convene around a common interest in addressing global challenges. Some of these communities at the Annual Meeting of the New Champions are listed below.

**The Network of Global Agenda Councils** comprises over 1,500 leaders from academia, business, government, international organizations and society. Grouped in more than 80 councils, they commit their extensive expertise and passion to jointly shape the global, regional and industry agendas. The councils address the most pressing issues of our time and aim to provide new thinking and solutions.

Science and technology councils include:
- Artificial Intelligence & Robotics
- Brain Research
- Data-Driven Development
- Economics of Innovation
- Nanotechnology
- Space

http://www.weforum.org/community/global-agenda-councils

The **Young Scientists** community brings together the world's most forward-thinking and advanced young scientific minds. They are selected from all regions and a wide range of disciplines, and have a track record of advancing the frontiers of science, engineering or technology in areas of high societal impact. In their work, they exhibit exceptional creativity, thought leadership and high growth potential. Aged under 40, these individuals have demonstrated their commitment to public service and actively play a transformational role in integrating scientific knowledge into society for the public good.

http://www3.weforum.org/docs/WEF_YoungScientists2014.pdf

The **Technology Pioneers** reunites information technology and new media, energy and environment, and life sciences and health companies from around the world that are involved in the design, development and deployment of new technologies, and promises to significantly impact the way business and society operate.

http://www.weforum.org/community/technologypioneers

The **Global Gender Parity Group and Women Leaders** communities consist of high-level women leaders from all walks of life who are committed to achieving gender parity. The communities serve as a platform for establishing meaningful dialogue on contemporary issues of relevance, including gender parity in STEM education and professions.

http://www.weforum.org/women-leaders-and-genderparity

The **Global University Leaders Forum (GULF)** community of the presidents of top universities provides a non-competitive platform for high-level dialogue on issues of higher education and research with other sectors; it fosters collaboration between universities in areas of significance for global policy. Initiatives that have been facilitated by GULF include the Society for the Advancement of Science and Technology in the Arab World and the Réseau d'excellence des sciences de l'ingénieur de la francophonie.

http://www.weforum.org/academic-networks

The **Forum of Young Global Leaders** is a community of exceptional young leaders who share a commitment to making the world a better place. Each year, the World Economic Forum identifies 200-300 extraordinary individuals worldwide. Together, they form a powerful international community that can dramatically impact the global future.

http://www.weforum.org/community/forum-youngglobal-leaders

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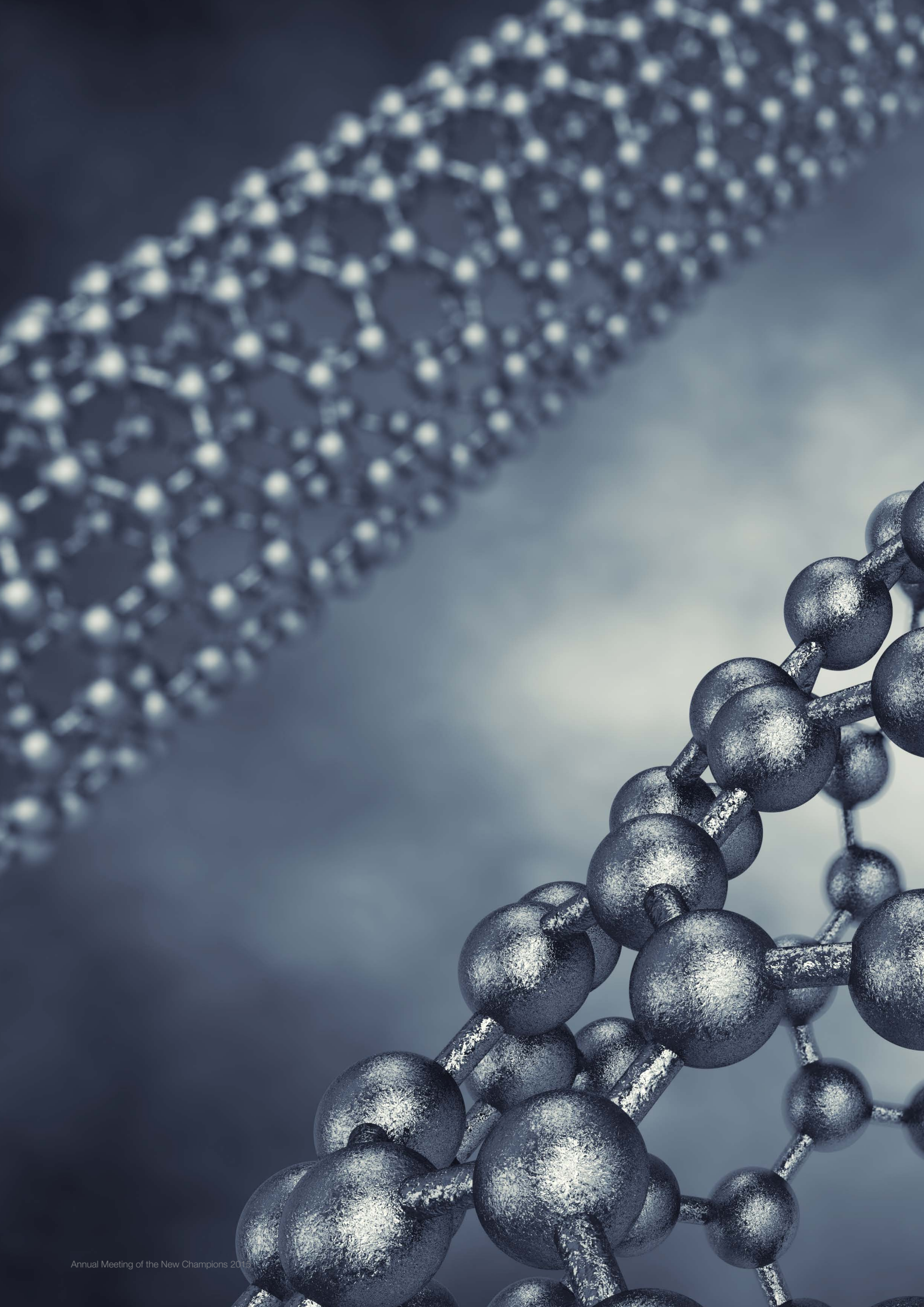

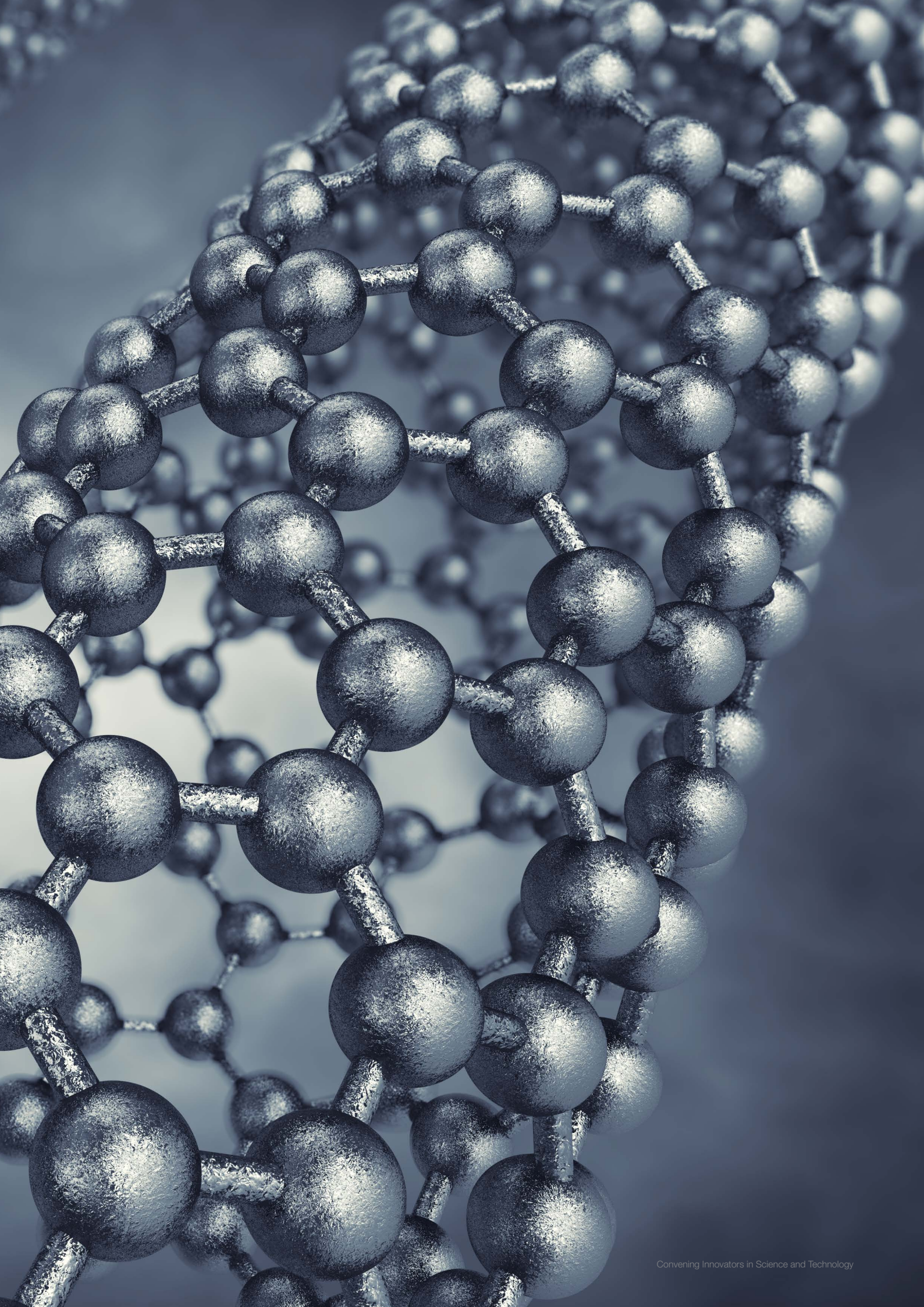


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