

Global Agenda

Convening Innovators from the Science and Technology Communities

Annual Meeting of the New Champions 2016

Tianjin, People's Republic of China 26-28 June



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W. Lee Howell
Head of Global Programming
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, the World Economic Forum has convened leaders from across the science and technology communities for our Annual Meeting of the New Champions 2016 – the foremost global gathering on science, technology and innovation. More than 1,600 leaders from business, government and research from over 90 countries will participate in 100-plus interactive sessions to:

- Foster strategic and technological agility to prepare organizations for the Fourth Industrial Revolution
- Connect with the next generation of research pioneers and business innovators addressing global challenges and disrupting industry models
- Spur scientific breakthroughs and technological innovations transforming economies and societies

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 the world's most pressing challenges

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

Meet the Innovators

Business Champions

Kees Aarts, Chief Executive Officer, Protix Biosystems
Martin Bruncko, Chief Strategy Officer and Chief Financial Officer, AeroMobil
Prateek Bumb, Chief Technology Officer, Carbon Clean Solutions (CCSL)
John Carrington, Chief Executive Officer, Stem
Feng Zhiqiang, Chief Technology Officer, Trina Solar
Liu Tianwen, Chairman and Chief Executive Officer, iSoftStone Information Technology (Group)
Rod Makoske, Senior Vice-President, Corporate Engineering, Technology and Operations, Lockheed Martin Corporation
Hugh Martin, Chief Executive Officer, Sensity Systems
Justin Moore, Chief Executive Officer, Axcient
Malek Sukkar, Chief Executive Officer, averda
Yan Xijun, Chairman of the Board, Tasly Holding Group

Policy and University Leaders

Jean-Pierre Bourguignon, President, European Research Council
Hongbo Chen, Vice-Dean, Tuspark Research Institute for Innovation, Tsinghua University
Sung-Mo Steve Kang, President, Korea Advanced Institute of Science and Technology (KAIST)
Sang Yup Lee, Distinguished Professor and Director, Korea Advanced Institute of Science and Technology (KAIST)
William H. Saito, Special Adviser, Cabinet Office of Japan
Tan Chorh Chuan, President, National University of Singapore

Communication Experts

Nick Campbell, Director, Greater China, Nature Research Group: Executive Editor, Springer Nature
Philip Campbell, Editor-in-Chief, Nature
Mariette DiChristina, Editor-in-Chief, Scientific American
Ed Gerstner, Executive Editor, Nature Journals, Greater China, Springer Nature
Gareth Mitchell, Lecturer, Broadcast Communication, Imperial College London
Wen Bo, Member, Scientific Committee, Air and Water Conservation Fund, National Geographic Society

Researchers

Justine Cassell, Associate Dean, Technology, Strategy and Impact, School of Computer Science, Carnegie Mellon University
Howard Choset, Professor, Robotics Institute, Carnegie Mellon University
Ronald Dahl, Director, Institute of Human Development, University of California, Berkeley
Paolo Dario, Director, The BioRobotics Institute, Scuola Superiore Sant'Anna Pisa
P. Murali Doraiswamy, Professor of Psychiatry and Medicine; Director, Neurocognitive Disorders Program, Duke University Health System
Leslea Hlusko, Associate Professor, University of California, Berkeley
Casey Lew-Williams, Assistant Professor, Princeton University
Carlo Ratti, Director, SENSEable City Laboratory, MIT - Department of Urban Studies and Planning
Randy Sargent, Senior Systems Scientist, Carnegie Mellon University
David Hyunchul Shim, Associate Professor, Department of Aerospace Engineering, Korea Advanced Institute of Science and Technology (KAIST)
Mahesh Srinivasan, Assistant Professor, Department of Psychology, University of California, Berkeley
Charis Thompson, Chancellor's Professor and Chair of Gender and Women's Studies, University of California, Berkeley
Krystyn Van Vliet, Professor, Materials Science and Engineering, Massachusetts Institute of Technology (MIT)
Byron Yu, Associate Professor, Electrical & Computer Engineering and Biomedical Engineering, Carnegie Mellon University

Pioneers and Innovators

Michael Altendorf, Co-Founder and Chief Executive Officer, Adtelligence
Yobie Benjamin, Co-Founder, Avegant Corporation
David Berry, General Partner, Flagship Ventures
Colin Calder, Chief Executive Officer, PassivSystems
Nathan Eagle, Chief Executive Officer, Jana
Valerie Feldmann, Vice-President, Product Innovation and Strategy, Ogin
Andrew Fursman, Chief Executive Officer, 1QB Information Technologies
Dileep George, Co-Founder and Chief Technology Officer, Vicarious
Ron Gutman, Founder and Chief Executive Officer, HealthTap
Marjolein Helder, Chief Executive Officer, Plant-e
Renat Heuberger, Chief Executive Officer and Deputy Chairman, South Pole Carbon
Jen Hyatt, Founder, Big White Wall

Marianne Eve Jamme, Founder and Chief Executive Officer, SpotOne Global Solutions
Richard Jefferson, Founder and Chief Executive Officer, Cambia
Neven Karlovac, Chief Executive Officer, Holomic
Corinna E. Lathan, Chair of the Board and Chief Executive Officer, AnthroTronix
Tan Le, Founder and Chief Executive Officer, Emotiv Lifesciences
Gene Lee, Founder and Chairman, Avellino Labs
Anmol Madan, Co-Founder and Chief Executive Officer, Ginger.io
Amit Narayan, Founder and Chief Executive Officer, AutoGrid Systems
Peter Platzer, Founder and Chief Executive Officer, Spire
Daan Roosegaarde, Artist, Studio Roosegaarde
Nina Tandon, President and Chief Executive Officer, EpiBone
Victor Tong Joo Chuan, Director, Social and Cognitive Computing Department, Institute of High Performance Computing, Agency for Science, Technology and Research (A*STAR)
Hank C. K. Wuh, Chairman, TruTag Technologies

Young Scientists

Adam Abate, Assistant Professor, Bioengineering, School of Pharmacy, University of California, San Francisco
Gerardo Adesso, Associate Professor, University of Nottingham
Sarah Amiri, Head of Council, United Arab Emirates Scientists and Lead, Emirates Mars Mission Science, Mohammed Bin Rashid Space Center
Osman M. Bakr, Associate Professor, Material Science and Engineering, King Abdullah University of Science and Technology
Noble Banadda, Professor and Head of Department, Agricultural and Bio-systems Engineering, College of Agricultural and Environmental Sciences, Makerere University
Michael Bowen, Biomedical Research Fellow, University of Sydney
Kellie Charles, Senior Lecturer, Research Group Leader of the Cancer Therapeutics Research Group, University of Sydney
Amit Etkin, Assistant Professor, Psychiatry and Behavioural Sciences, Stanford University
Jin Xianmin, Professor; Founder, Laboratory of Quantum Integrated Photonics, Shanghai Jiao Tong University
Yasuaki Takehi, Associate Professor, Faculty of Environment and Information Studies, Keio University
Sander Kasteren, Assistant Professor, Faculty of Science, Leiden University
Rob Knight, Professor, University of California, San Diego (UCSD)

Ellouise Leadbeater, Senior Lecturer, School of Biological Sciences, Royal Holloway, University of London
Jackson Mohlopheni Marakalala, Senior Lecturer and Group Leader, University of Cape Town
Mei Lin Neo, Research Fellow, Tropical Marine Science Institute, National University of Singapore
Tolu Oni, Senior Lecturer, Division of Public Health Medicine, School of Public Health, University of Cape Town
Amanda Randles, Assistant Professor, Biomedical Engineering, Duke University
Ozgur Sahin, Associate Professor, Department of Biological Sciences and Department of Physics, Columbia University
Björn Schuller, Reader, Imperial College London
Fabio Sciarrino, Associate Professor, Physics Department, University of Rome La Sapienza
Shi Qihui, Professor, Shanghai Center for Systems Biomedicine, Shanghai Jiao Tong University
Maria Elena Torres Padilla, Group Leader and Director, University of Strasbourg
Kirill Veselkov, Waters Lecturer in Computational Medicine, Imperial College London
Komminist Weldermariam, Manager and Research Scientist, IBM Research Africa
Yu Kyoungsik, Associate Professor, School of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST)

Business Champions

Insect products



Kees Aarts is the Founder and Chief Executive Officer of Protix Biosystems, a company that produces, processes and supplies high-quality insect products as part of the solution to the protein crisis. Aarts' passion for biology and technology sparked the idea for Protix Biosystems.

Flying cars



Martin Bruncko is Chief Strategy Officer and Chief Financial Officer of AeroMobil, a flying car manufacturer. 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.

Carbon-clean solutions



Prateek Bumb is Co-Founder and Chief Technology Officer of Carbon Clean Solutions, which provides innovative technology solutions to power plants, steel, cement, fertilizer, chemical and petrochemical industries for reducing CO2 emissions. Bumb is responsible for the company's research and development, and is an expert in CO2 capture processes and solvents.

Energy optimization



John Carrington is Chief Executive Officer of Stem, a leading provider of energy optimization services. He has over 25 years' experience in a variety of fields, such as global innovation, healthcare, electronics, business equipment, transport and aviation, solar, wind, defence, telecommunications and security.

Solar power



Feng Zhiqiang is Chief Technology Officer of Trina Solar, which produces ingots, wafers, solar cells and solar modules. Feng has over 25 years' experience in research and development of semiconductor process engineering technology along with a wealth of experience in crystalline silicon solar cell technology research and development, and solid technical expertise.

Smart technology services



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.

Innovative engineering



Rod Makoske is Senior Vice-President of Corporate Engineering, Technology and Operations at Lockheed Martin. He is responsible for providing corporate leadership in the strategic areas of technology, engineering, production, supply chain, programme management and sustainment operations. As the principal engineering and operational leader for the corporation, Makoske ensures engineering, technical and operational excellence across the enterprise.

Energy-efficient LED lighting



Hugh Martin is Chairman and Chief Executive Officer of Sensity Systems, a company that uses energy-efficient LED to reduce energy costs and implement a variety of applications and services. Martin has a 35-year track record as an entrepreneurial leader of cutting-edge technology companies, new ventures and high-growth businesses, founding and leading companies specializing in third-generation DNA sequencing and high-speed optical telecommunications systems

Cloud platform



Justin Moore is Chief Executive Officer of Axcient, a company that solves complicated technology problems to help businesses run at their full potential without interruption. He has led the transformation of the data back-up and business continuity industry to end data loss and IT downtime. He has more than a decade of experience growing successful technology companies.

Waste management



Malek Sukkar is Chief Executive Officer of averda, a Lebanese brand regrouping three companies dedicated to waste cleaning, collection and processing, as well as technological research and manufacturing of processing machines. He sees waste management as a sector that could have a positive impact on Lebanon's progress, environment and public well-being.

Chinese medicines



Yan Xijun is Chairman of Tasly Holding Group. The company focuses on innovations in standards and technologies to produce high-quality, stable and controllable traditional Chinese medicines, in particular for the treatment of cardiovascular and cerebral illnesses.

Policy and University Leaders

Scientific excellence



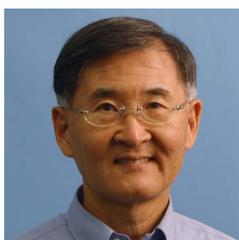
Jean-Pierre Bourguignon is President of the European Research Council (ERC), which is responsible for encouraging the highest quality research in Europe through competitive funding and supporting investigator-driven frontier research across all fields on the basis of scientific excellence. A mathematician by training, Bourguignon has received many awards and honours throughout his career.

Scientific innovation



Hongbo Chen is Vice-Dean of the Tsinghua 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.

Electrical engineering



Sung-Mo Steve Kang is President of the Korea Advanced Institute of Science and Technology (KAIST). He is an electrical engineering scientist and has written extensively in the field of computer-aided design for electronic circuits and systems. He led the development of the world's first 32-bit microprocessor chips and designed satellite-based private communication networks. Kang holds 15 US patents and has won numerous awards for his groundbreaking achievements in the field of electrical engineering.

Bio-engineering and biotechnology



Sang Yup Lee is Distinguished Professor and Director of the Korea Advanced Institute of Science and Technology (KAIST). He is one of the world's leading experts in bio-engineering and biotechnology. His research has focused on metabolic and biochemical engineering, industrial biotechnology and biorefineries, systems and synthetic biology, nanobiotechnology and disease diagnostics. He has published more than 500 journal papers and holds 580 patents.

Innovative technology identification



William H. Saito is Special Adviser of the Cabinet Office of Japan, as well as President and Chief Executive Officer of InTecur, a company that identifies innovative technologies and develops global talent. He is one of the world's leading authorities on encryption, authentication and biometric technologies. Saito has also advised many scientific entities, including the Fukushima Nuclear Accident Independent Investigation Commission and the Japan Society for the Promotion of Science.

Biomedical sciences



Tan Chorh-Chuan is President of the National University of Singapore (NUS). He has had a long career as a renal physician. He joined NUS in 1987 and has since occupied many positions, from senior consultant to Professor of Medicine to Head of Department. He is a key leader in Singapore's Biomedical Sciences Initiative since its inception in 2000, for which he was awarded the National Science and Technology Medal in 2008.



Communication Experts

Health communication



Nick Campbell is the Executive Editor of Nature and oversees its partnerships and supplements program. 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.

Science communication



Philip Campbell is the Editor-in-Chief of science journal Nature. He heads a team of about 90 editorial staff around the world and takes direct responsibility for the content of Nature's editorials, contributing to its writing. He also sits on the executive board of Nature's parent company, Nature Publishing Group.

Science communication



Mariette DiChristina is Editor-in-Chief at Scientific American. She is the first woman to assume this top position. 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.

Chinese research promotion



Ed Gerstner is Executive Editor at Nature Journals. He has over a decade of experience working for Nature Journals as an editor for Nature, Nature Physics, Nature Materials and Nature Communications. He has been responsible for building Nature's editorial presence in China, forging closer links with the Chinese research community, championing the benefits of open research, and helping Chinese scientists publish their research in the world's best journals.

Technology communication

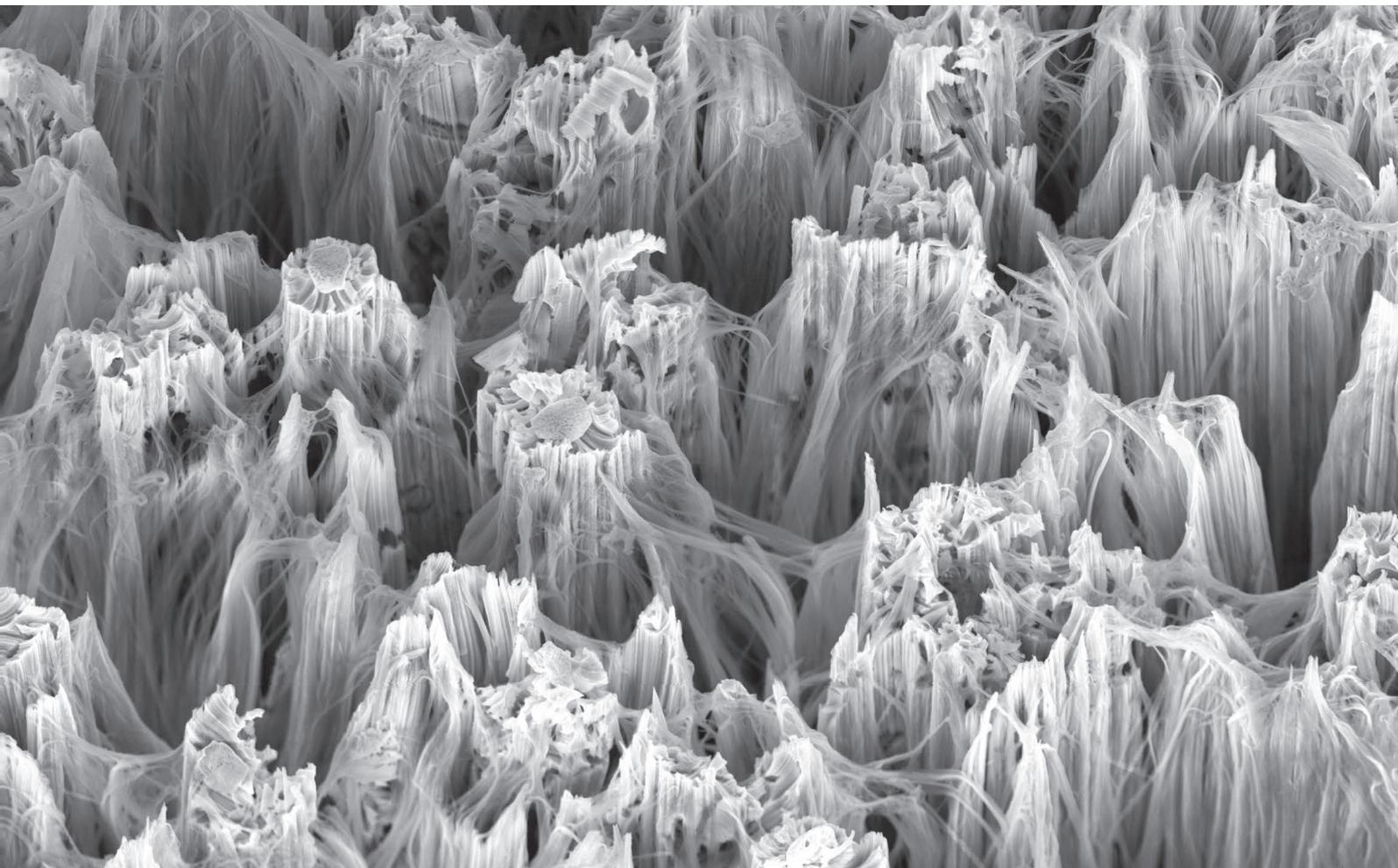


Gareth Mitchell is Lecturer in Broadcast Communication at Imperial College London as well as an active science journalist, presenting a weekly technology programme for the BBC World Service. He reports regularly for science programmes for BBC Radio 4 and writes for BBC Focus magazine as the technology expert on the publication's Q&A pages.

*Environment
communication*



Wen Bo is a Member of the Scientific Committee of the Air and Water Conservation Fund at the National Geographic Society. He is a former journalist for China Environment News, where he reported on China's environmental problems. He has studied, lived and worked in China, the Republic of Korea and Japan, and has a comparative understanding of environmental problems, activism and governance in these countries.



Researchers

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.

Snake robots



Howard Choset is Professor at the Robotics Institute at Carnegie Mellon University. Motivated by applications in confined spaces, he has created a comprehensive programme in snake robots, which has led to basic research in mechanism design, path planning, motion planning and estimation. He also co-founded Medrobotics, a company that manufactures small surgical snake robots for minimally invasive surgeries.

Behavioural and emotional disorders



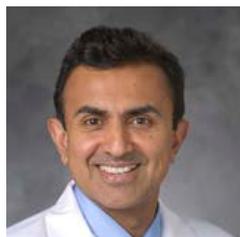
Ronald Dahl is the Director of the Institute of Human Development at the University of California, Berkeley, where he also serves as Professor in the School of Public Health and the Joint Medical Program. He is a paediatrician and developmental scientist with long-standing research interests in the development of sleep/arousal regulation and how it affects the development of behavioural and emotional disorders in children and adolescents.

Biorobotics



Paolo Dario is the Director of the BioRobotics Institute at Scuola Superiore Sant'Anna Pisa, where he teaches Biomedical Engineering. He works on theoretical models, design methods, precision technologies for the fabrication of novel components and integrated systems, machines and robots. Dario has contributed to the foundation of cross-field research such as micro and biomechatronics, biorobotics and neuro-robotics.

Cognitive and emotional health



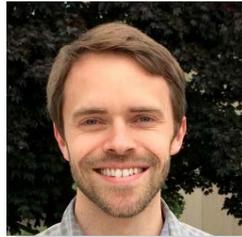
P. Murali Doraiswamy is Professor of Psychiatry and Medicine and Director of the Neurocognitive Disorders Program at Duke University Health System, where he focuses on understanding mechanisms of cognitive and emotional health, and on developing novel personal diagnostic tools and therapeutics for neurocognitive enhancement. Doraiswamy has been involved in the development of many of the leading treatments widely used today for clinical depression and Alzheimer's disease.

Morphological evolution



Leslea Hlusko is Associate Professor in the Biology Department of the University of California, Berkeley, where she studies the genetic and developmental basis of mammalian skeletal evolution and variation by looking at primate dentition, which enables her to model statistically the role genes play in morphological evolution.

Learning mechanisms



Casey Lew-Williams is Assistant Professor at Princeton University, where he studies learning mechanisms and features of language environments to understand the beginnings and consequences of learning through experience. He combines methods from the fields of psychology, linguistics and communication.

New cities



Carlo Ratti is Director of the SENSEable City Laboratory at the MIT Department of Urban Studies and Planning. His research group explores how new technologies are changing the way we understand, design and ultimately live in cities – from street grids to plumbing and garbage systems – using new kinds of sensors and hand-held electronics. Ratti has a vision for smart cities that would use the human face of urban technologies and their potential in promoting bottom-up social empowerment.

Datasets and complex systems



Randy Sargent is a Senior Systems Scientist at Carnegie Mellon University. He is a researcher 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.

Unmanned aerial vehicles



David Hunchul Shim is Associate Professor in the Department of Aerospace Engineering at the Korea Advanced Institute of Science and Technology (KAIST), where he leads efforts on flight control, unmanned systems and robotic systems, and developing autonomous unmanned aerial vehicles.

Psycholinguistics



Mahesh Srinivasan is Assistant Professor in the Department of Psychology at the University of California, Berkeley. Using empirical methods from developmental psychology and psycholinguistics, his lab's research explores how linguistic, cognitive and social abilities arise and interact with one another during human development and across different cultures.

Environmental and life sciences



Charis Thompson is Chancellor's Professor and Chair of Gender and Women's Studies at the University of California, Berkeley. Her research interests are in the social, ethical and political study of environmental and life sciences, as well as biomedicine and stem cells. She is known for the concepts of ontological choreography, promissory capital and biomedical mode of reproduction.

Material chemomechanics



Krystyn Van Vliet is Professor of Materials Science and Engineering at the Massachusetts Institute of Technology (MIT), where she studies material chemomechanics – material behaviour at the interface of mechanics, chemistry, physics and biology. She focuses on cell interfaces and environments relevant to the healing of wounds and inflammation, cancer and stem/precursor cell development. Van Vliet's long-term goal is to predict and modulate the key functions of biological cells.

Brain-machine interfaces



Byron Yu is an Associate Professor of Electrical and Computer Engineering and Biomedical Engineering at Carnegie Mellon University. He is a leader in the field of brain-machine interfaces (BMI), designed to help paralysed patients and amputees regain movement. He uses BMI to study how the brain changes during learning and how learning can be accelerated.



Pioneers and Innovators

e-commerce



Michael Altendorf is the Chief Executive Officer and Co-Founder of Adtelligence, an e-commerce marketing technology company. He is a lecturer at business schools and universities for internet business and entrepreneurship. 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.

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. He 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.

Life sciences and sustainability



David Berry is General Partner of Flagship Ventures, where he focuses on innovating, entrepreneuring and investing in new ventures in life sciences and sustainability. He has a background in Biological Engineering and serves on the Leadership Council of the United Nations Sustainable Development Solutions Network.

Software



Colin Calder is the Founder and Chief Executive Officer of PassivSystems, a software developer for monitoring and optimizing equipment in the home and for managing and reducing domestic heating energy costs and consumption. Calder has 30 years of experience in the software and technology sectors, with a significant proportion of his career being involved in the bringing together of mobile and the internet.

Free unrestricted internet



Nathan Eagle is the Co-Founder and Chief Executive Officer of Jana, the largest provider of free unrestricted internet access in emerging markets. Eagle is also an Adjunct Assistant Professor at Harvard University. His PhD from the MIT Media Laboratory on reality mining was declared one of the "10 technologies most likely to change the way we live" by the MIT Technology Review.

Energy strategy



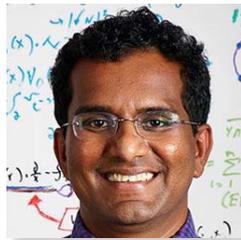
Valerie Feldmann is Vice-President of Product Innovation and Strategy at Ogin. She leads the product innovation, distinctive technology and intellectual property of the company's distributed energy solutions. She has published six books and numerous articles on technology strategy and policy.

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. He researches quantum computation and the practical applications of microbiology.

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 and conducted research on hierarchical models of the brain.

Digital health innovation



Ron Gutman is Founder and Chief Executive Officer of HealthTap, a company that seeks to reinvent worldwide the way people take care of their health and well-being. A thought leader in digital health and innovation, Gutman has been developing mobile and online health applications serving hundreds of millions of people worldwide.

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, offering new opportunities for multiple land use, combining energy with food or nature on the same surface area.

Sustainable development



Renat Heuberger is Chief Executive Officer and Deputy Chairman of South Pole Carbon, which combines local commitment for sustainable development in emerging and developing countries with solutions for global climate change. The company has enabled over 250 projects worldwide, ranging from renewable energy to waste treatment and forestry, thereby reducing millions of tonnes of CO₂ and creating thousands of jobs.

*Data analytics and
mental health*



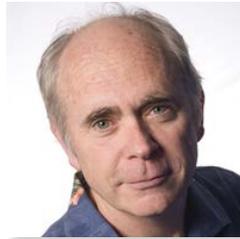
Jen Hyatt is the Founder of Big White Wall, a company that uses digital technology and data analytics to transform the mental health journey into one of personalized support and recovery that is available immediately and anonymously 24/7. Hyatt is widely recognized for her achievements in the fields of social entrepreneurship and digital technology.

Technology activism



Marianne Eve Jamme is the Founder and Chief Executive Officer of SpotOne Global Solutions, which helps technology companies to get a foothold in Africa, Europe, the Middle East and Asia. Jamme is also Advisory Board Member of Data Pop Alliance, a global coalition promoting a people-centred big data revolution. She conducts activism work in empowering young women through creative learning, entrepreneurship, science, technology, engineering, art, design and mathematics.

*Innovation
democratization*



Richard Jefferson is Founder and Chief Executive Officer of Cambia, an independent non-profit institute creating new technologies, tools and paradigms to promote change and enable innovation. He developed the GUS reporter gene system, which is now the most widely used tool in plant molecular biology, and initiated and managed the world's first field release of a transgenic food crop. Jefferson now focuses on microbial population genomics through the lens of the hologenome theory of evolution and its impact on health, environment and agriculture.

Healthcare improvement



Neven Karlovac is Chief Executive Officer of Holomic, a technology company dedicated to improving patient healthcare with the use of smartphones and biophotonics. Previously, he was one of the technical and business leaders in the US who took fibre-optic communications from the lab and transformed it into a global telecommunications network.

*Human-centred
technology*



Corinna E. Lathan is Founder and Chief Executive Officer of AnthroTronix, an engineering research and development company that produces human-centred technology. She is involved in educational outreach programmes promoting STEM education, including the FIRST and VEX robotics programmes. She is also on the Board of Engineering World Health, which supports the emergence of healthcare technology in the developing world.

Crowdsourced brain research



Tan Le is Founder and Chief Executive Officer of Emotiv Lifesciences, a bio-informatics company offering a platform for crowdsourced brain research. It enables organizations to rapidly collect brain data on the precise characteristics of a target demographic, leveraging the talent of multidisciplinary researchers across mathematics, statistics, signal processing, artificial intelligence, data mining, image processing, biology and medicine to analyse data and provide meaningful analysis and discoveries.

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. 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.

Patient health monitoring



Anmol Madan is Co-Founder and Chief Executive Officer of Ginger.io, a company that provides a mobile and web platform to help providers, healthcare organizations and other stakeholders to stay connected to patients between office visits. Madan has an extensive research experience in modelling large-scale human behaviour data using statistical models and pattern recognition technology.

Energy data platform



Amit Narayan is Founder and Chief Executive Officer of AutoGrid, an energy data platform. He previously 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.

Satellites



Peter Platzer is Co-Founder and Chief Executive Officer of Spire, a company providing 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.

Social design and technology



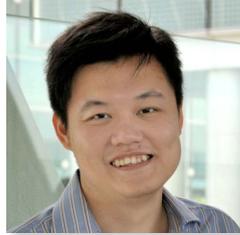
Daan Roosegaarde is the artist behind Studio Roosegaarde. He is internationally known for creating social designs exploring the relation between people, technology and space. With projects ranging from fashion to architecture, his interactive designs are tactile high-tech environments in which viewer and space become one. This connection, established between ideology and technology, results in what Roosegaarde calls “techno-poetry”.

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 and 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.

Social and cognitive computing

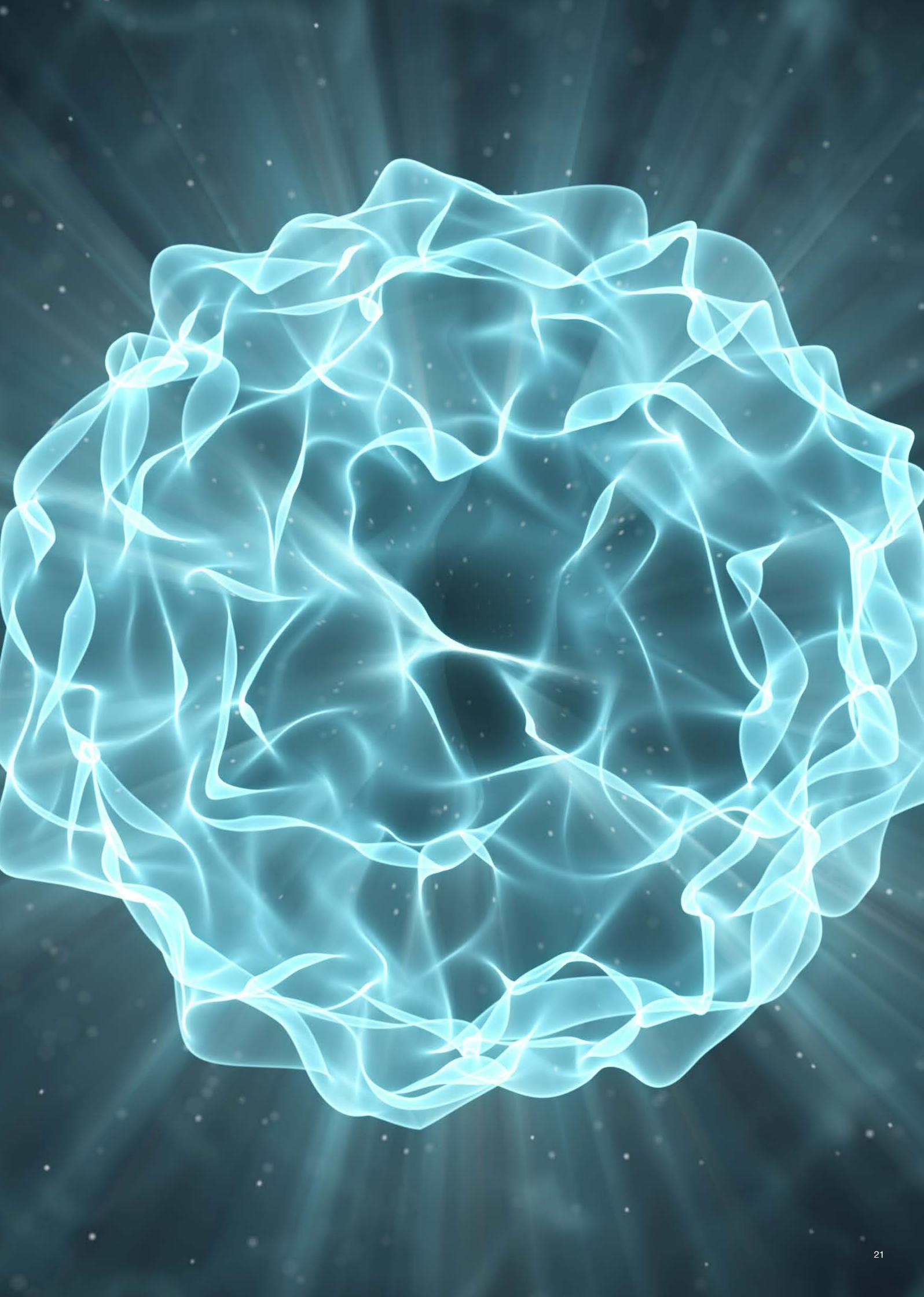


Victor Tong Joo Chuan is Director of the Social and Cognitive Computing Department at the Institute of High Performance Computing of the Agency for Science, Technology and Research. His research interests include data mining, machine-learning, bioinformatics, computational immunology and social computing. Tong has received numerous awards for his work, including the MIT TR35 Award and the Singapore Youth Award for Science & Technology.

Anti-counterfeiting data

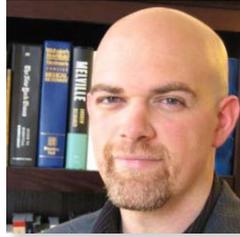


Hank C. K. Wuh is Chairman of TruTag Technologies, a data-rich security platform for the authentication and anti-counterfeiting of food, medicine and industrial components. He is also a surgeon, inventor and entrepreneur. He has led the development of over 20 biomedical innovations. He was the Chief 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.



Young Scientists

Microfluidic methods



Adam Abate is Assistant Professor in Bioengineering at the School of Pharmacy of the University of California, San Francisco. His research is at the intersection of physics, chemistry and biology. He has developed microfluidic methods to fabricate emulsions that consist of droplets that are used as micro-compartments – like tiny test tubes – to perform chemical and biological reactions with single cells and active materials, such as drugs, nutrients and assay reagents. This approach is used for directed evolution, genetic sequencing and cell sorting.

Quantum information



Gerardo Adesso is Associate Professor at the University of Nottingham, where he focuses on the identification and quantification of quantum resources for efficient quantum information technology. He has also contributed significantly to the development of quantum information theory with Gaussian states of continuous variable systems.

Space



Sarah Amiri is Head of Council, United Arab Emirates Scientists, and Lead, Emirates Mars Mission Science at the Mohammed Bin Rashid Space Center, where she leads the design and development of the UAE's first unmanned aerial system. She also develops the Mission's scientific objectives, goals, instrumentation and analysis programmes.

Advanced materials



Osman M. Bakr is Associate Professor of Material Science and Engineering at the King Abdullah University of Science and Technology, where he aims to fabricate advanced materials that promise to become building blocks for solar cells, batteries, photonic and opto-electronic devices.

Bioremediation and waste water management



Noble Banadda is Professor and Head of Department at the College of Agricultural and Environmental Sciences of 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.

Central nervous system drugs



Michael Bowen is Biomedical Research Fellow at the University of Sydney, where he applies cutting-edge cellular and pre-clinical research techniques to central nervous system drug discovery and drug development. Some of his most important work to date has been co-inventing a novel drug treatment for alcohol-use disorders and a novel series of compounds targeting social deficits in psychiatric and neurological disorders, such as autism.

Malignant and immune cells



Kellie Charles is Senior Lecturer in the Research Group Leader of the Cancer Therapeutics Research Group of the University of Sydney, where she investigates the interactions between malignant cells and immune cells that regulate tumour progression in order to design and evaluate new cancer therapeutic agents.

Emotional disorders



Amit Etkin is Assistant Professor of Psychiatry and Behavioral Science at Stanford University. His lab aims 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.

Quantum integrated photonics



Jin Xianmin 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 the 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.

Digital interactions



Yasuaki Kakehi is Associate Professor in the Faculty of Environment and Information Studies at Keio University, where he explores the interaction between new media, the environment and human beings. He is trying to bridge the physical world in which we exist with the digital world that is constructed by computers, developing interactive media and tools that affect the properties of physical materials.

Immune system



Sander Kasteren is Assistant Professor in the Faculty of Science at Leiden University, where he focuses on developing new chemical tricks to study and manipulate the immune system. His research may well contribute to the development of more effective vaccines against cancer as he researches whether some sugar patterns activate the immune system against cancer better than others.

Human microbiome



Rob Knight is Associate Professor of Chemistry, Biochemistry and Computer Science at the University of Colorado, Boulder, where he focuses on genomics, molecular evolution and the microbiome. He researches how the human microbiome develops and how variation in the microbiome affects health and disease. His research combines computational and experimental techniques to ask questions about the evolution of the composition of biomolecules, genomes and communities.

Social evolution



Ellouise Leadbeater is Senior Lecturer in the School of Biological Sciences at the Royal Holloway, University of London, where she researches evolutionary drivers of sociality and the mechanistic routes by which social evolution occurs. She focuses on the evolution of cognitive processes guiding social behaviour, studying social insects such as ants, bees and wasps.

Tuberculosis



Jackson Mohlopheni Marakalala is Senior Lecturer and Group Leader at the University of Cape Town. His research focuses on molecules that can inhibit growth of tuberculosis-causing bacteria by targeting particular genes of the bacteria.

Marine conservation



Mei Lin Neo is a Research Fellow at the Tropical Marine Science Institute of the National University of Singapore, where she studies a group of critically endangered marine species, the giant clams, which play a significant role in the coral reef ecosystems as providers of food, shelter and calcium. Her study provides key information to support a giant clam restocking programme, as well as help designate conservation priorities for local populations.

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, tuberculosis diagnostics, treatment, co-infections and associated diseases, as well as changing patterns of diseases in Africa.

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.

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.

Speech processing technology



Björn Schuller is Reader at Imperial College London where he focuses on speech processing technology. He uses novel techniques for multi-task and semi-supervised learning to deliver intelligent, holistic and evolving analysis in real-life condition of universal speaker characteristics.

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. He has developed 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.

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 various proteins associated with multiple signal transduction pathways in single tumour or immune cells.

Embryonic development



Maria Elena Torres Padilla is Group Leader and Director at the University of Strasbourg, where she is devoted to understanding how the structure of the chromatin is established at the beginning of embryonic development and how it supports totipotency. Her work will provide new insight in understanding the biology of the pluripotent stem cells, in particular on their origin and development.

Computational medicine



Kirill Veselkov is Lecturer in Computational Medicine at Imperial College London. He is an expert 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.

Technology education

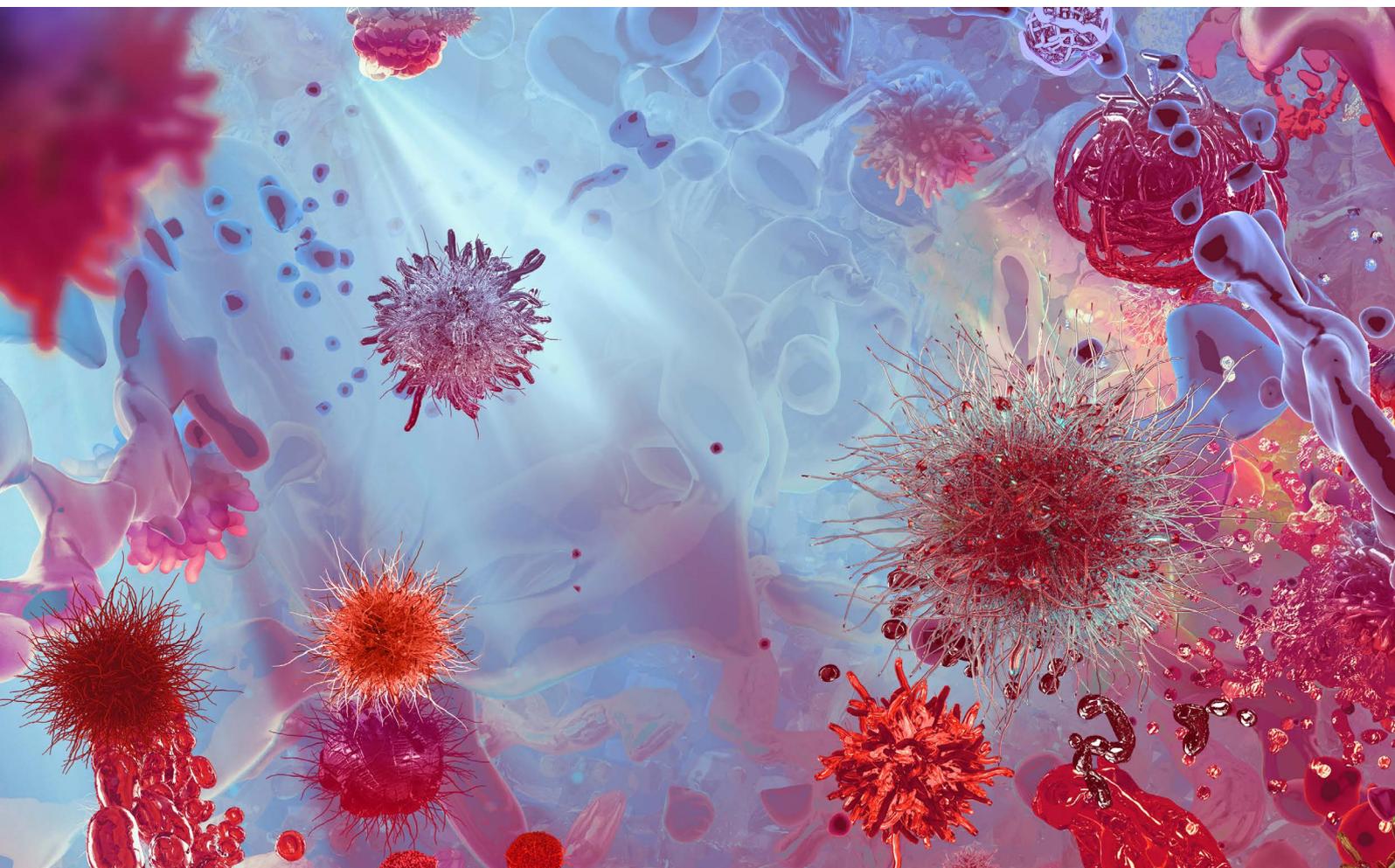


Komminist Weldermariam is Manager and Research Scientist at IBM Research Africa. He is an expert in software systems, security and education technologies and focuses on creating innovative solutions that impact lives. He is developing evidence-based solutions that aim to transform education in Africa by individualizing its delivery to each child.

Opto-electronics



Yu Kyongsik is Associate Professor at the School of Electrical Engineering of the Korea Advanced Institute of Science and Technology (KAIST). He focuses on the area of integrated opto-electronic 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.



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/communities/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://www.weforum.org/communities/young-scientists>

The Technology Pioneers community 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 which promise to significantly impact the way business and society operate.

<http://www.weforum.org/communities/technology-pioneer>

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 and 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/communities/academic-policy-and-research-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/communities/forum-young-global-leaders>

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