

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 Shinerly. 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 metabolomics from Imperial College London.

Tuberculosis



Jackson Mohlopheni Marakalala is postdoctoral Researcher in Biochemistry at Harvard Medical School. His research focuses on molecules that 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



Ozgun 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.