

SciLifeLab Science Summit 2019

Artificial Intelligence for Life Sciences

Uppsala Konsert och Kongress, Uppsala, May 15, 2019

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Speaker biographies

SciLifeLab

Keynote speakers

Hiroaki Kitano

The Systems Biology Institute/Sony Computer Science Laboratories, Inc.

Nobel Turing Challenge for Creating the Engine of Scientific Discovery: Moonshot of AI, Robotics and Systems Biology

Hiroaki Kitano is a President & CEO at Sony Computer Science Laboratories, Inc., Tokyo, a Senior Vice President at Sony Corporation, Tokyo, a President at The Systems Biology Institute, Tokyo, and a Professor at Okinawa Institute of Science and Technology Graduate University, Okinawa. He received a B.A. in physics from the International Christian University, Tokyo, and a Ph.D. in computer science from Kyoto University. Since 1988, he has been a visiting researcher at the Center for Machine Translation at Carnegie Mellon University. His research career includes a Project Director at Kitano Symbiotic Systems Project, ERATO, Japan Science and Technology Corporation followed by a Project Director at Kitano Symbiotic Systems

Project, ERATO-SORST, Japan Science and Technology Agency, a Group Director of Laboratory for Disease Systems Modeling at RIKEN Center for Integrative Medical Sciences, and so on. He is also an Editor-in-Chief of npj Systems Biology and Applications, and a Founding Trustee of The RoboCup Federation. Kitano received The Computers and Thought Award from the International Joint Conferences on Artificial Intelligence in 1993, Prix Ars Electronica 2000 and Nature's 2009 Japan Mid-career Award for Creative Mentoring in Science. His research interests include computational biology, artificial intelligence, massively parallel computer, autonomous robot, systems biology, and open energy system.

Ross D. King

Professor of Machine Intelligence, University of Manchester

Automating Science using Robot Scientists

Ross D. King is Professor of Machine Intelligence at the University of Manchester, UK. He is one of the most experienced machine learning researchers in the UK. His main research interest is the interface between computer science and science. He originated the idea of a 'Robot Scientist': integrating AI and laboratory robotics to physically implement closed-loop scientific discovery. His Robot Scientist 'Adam' was the first machine to autonomously discover scientific knowledge. His Robot Scientist 'Eve' is currently searching for drugs against neglected

tropical diseases, and cancer. This research has been published in top scientific journals, Science, Nature, etc. and has received wide publicity. His other core research interest is DNA computing. He developed the first nondeterministic universal Turing machine, and is now working on 'DNA supremacy': a DNA computer that can solve larger NP complete problems than conventional or quantum computers. He is also very interested in computational economics and aesthetics.

Eran Segal

Department of Computer Science And Applied Math, Weizmann Institute of Science

Personalized Medicine based on Gut Microbiome and Clinical Data

Eran Segal is a Professor at the Department of Computer Science and Applied Mathematics at the Weizmann Institute of Science, heading a lab with a multi-disciplinary team of computational biologists and experimental scientists in the area of Computational and Systems biology. His group has extensive experience in machine learning, computational biology, probabilistic models, and analysis of heterogeneous high-throughput genomic data. His research focuses on Microbiome, Nutrition, Genetics, and their effect on health and disease. His aim is to develop personalized nutrition and personalized medicine.

Prof. Segal published over 140 publications, and received several awards and honors for his work, including the Overton prize,

awarded annually by the International Society for Bioinformatics (ICSB) to one scientist for outstanding accomplishments in computational biology, and the Michael Bruno award. He was recently elected as an EMBO member and as a member of the young Israeli academy of science. Before joining the Weizmann Institute, Prof. Segal held an independent research position at Rockefeller University, New York.

Education: Prof. Segal was awarded a B.Sc. in Computer Science summa cum laude in 1998, from Tel-Aviv University, and a Ph.D. in Computer Science and Genetics in 2004, from Stanford University. Lab website: <http://genie.weizmann.ac.il>

Fabian Theis

Institute of Computational Biology, Helmholtz Center Munich

Modeling differentiation and stimulation response in single-cell genomics

Fabian Theis obtained MSc degrees in Mathematics and Physics at the University of Regensburg in 2000. He received a PhD degree in Physics from the same university in 2002 and a PhD in Computer Science from the University of Granada in 2003. He worked as visiting researcher at the department of Architecture and Computer Technology (University of Granada, Spain), at the RIKEN Brain Science Institute (Wako, Japan), at FAMU-FSU (Florida State University, USA) and at TUAT's Laboratory for Signal and Image Processing (Tokyo, Japan), and headed the 'signal processing & information theory' group at the Institute of Biophysics (Regensburg, Germany). In 2006, he started working as Bernstein fellow leading a junior research group at the Bernstein Center for Computational Neuroscience, located at the Max Planck Institute for Dynamics and Self-Organization at Göttingen. In summer 2007, Fabian Theis became working group head of CMB at the Institute of Bioinformatics at the Helmholtz Center Munich. In spring 2009, he became associate Professor for Mathematics in Systems Biology at the Math Department of the TU Munich. 2009-2014 he was member

of the 'Young Academy' (founded by the Berlin-Brandenburg Academy of Sciences and Humanities and the German Academy of Natural Scientists Leopoldina). In 2010 he was awarded an ERC starting grant. Since May 2013 Fabian Theis is Director of the Institute of Computational Biology at the Helmholtz Zentrum München and holds the Chair "Mathematical Modeling of Biological Systems" at the Department of Mathematics of the TU Munich. Since 2019 he is associate faculty at the Wellcome Trust Sanger Institute, Hinxton, UK. His research interests include development of computational methods for analyzing and modelling single cell heterogeneities as well as machine and in parts deep learning for prediction in biology and biomedicine. In 2017 he was awarded the Erwin Schrödinger prize together within an interdisciplinary team at the ETH Zürich. Fabian Theis is part of and also coordinates various consortia (i.e. sparse2big involving 8 Helmholtz Centers) and founded the network SingleCellOmics Germany (SCOG). Furthermore he coordinated the recently launched Munich School for Data Science (MUDES).

National speakers

Fredrik Barrenäs

Department of Cell and Molecular Biology, Computational Biology and Bioinformatics, Uppsala University

One step closer to an HIV vaccine — What machine learning tells us about vaccine protection and immunity

Fredrik Barrenäs is a research scientist in bioinformatics. As a post doc at the University of Washington (UW) in Seattle, Dr. Barrenäs established a collaboration between the HIV vaccine development effort at UW and machine learning experts at Uppsala University. Dr Barrenäs now performs computation-

al analyses of transcriptomic profiles collected during vaccine testing to predict protection and improve future vaccine design. Dr Barrenäs core research interests include host immune responses to infectious pathogens and vaccines, machine learning and big data approaches in immunology.

Helena Lindgren

Associate Professor, Department of Computing Science at Umeå University

Socially Intelligent Systems and Robots – when we need to Collaborate with the AI

Helena Lindgren is Associate Professor in Computer Science at Umeå University in Sweden. As a former Occupational Therapist and expert on adaptation of work places for people with various needs for cognitive, social, emotional and physical support, she takes particular interest in how AI can manifest similar capacities as humans, adapt, support and evolve over time as individuals and teams develop. She leads research projects on persuasive technology, clinical decision support, socially intel-

ligent digital companions for managing stress-related exhaustion, and behavior change technology for improving health and emotional well-being. She is member of the board of the Swedish Artificial Intelligence Society (SAIS), program committee for the AI branch of the Wallenberg AI, Autonomous Systems and Software Program (WASP), and the national coordination group for AI Competence for Sweden.

Andreas Theodorou

Scientist, Department of Computing Science, Umeå University

AI Governance: Building Transparent and Trustworthy Systems

Andreas' main research interest is the design and application of Intelligent Systems, and its effects on human society. He is currently working as a postdoctoral researcher at Umeå University Responsible AI Research Group under the leadership of Prof Virginia Dignum . His ongoing research, funded by the Horizon2020 AI4EU project, aims for the development of guidelines for the design, implementation, and deployment intelligent systems. The said guidelines integrate the socio-economic, legal, and other ethical considerations that arise from integrating AI into our societies. In parallel to his current post, Andreas is a member of AI policy initiatives; e.g. IEEE SA' P7000 series, ISO JTC1/42, EU's AI Alliance, and others.

Andreas undertook his doctoral studies under the supervision of Dr. Joanna Bryson at the University of Bath. His work there includes the development of tools and methodologies to provide algorithmic transparency, while exploring the understanding and intuitions that can guide moral decision making and human cooperative behaviour. In 2017-18 Andreas served as a Teaching Fellow at the University of Bath, in 2016 as a short-term visiting scholar at the Georgia Institute of Technology, and finally as a machine learning researcher at the University of Surrey in 2015.

Panel discussion participants

Thomas Schön

Professor, Department of Information Technology, Uppsala University

Moderator Panel discussion

Thomas Schön is Professor of the Chair of Automatic Control in the Department of Information Technology at Uppsala University. Schön has a broad interest in developing new algorithms and mathematical models capable of learning from data. His main scientific field is Machine Learning, but he regularly publishes in other fields such as Statistics, Automatic Control, Signal Processing and Computer Vision. He pursues both basic research and applied research, where the latter is typically carried out in collaboration with industry or university research groups. He is a member of The Royal Swedish Academy of Engineering Sciences (IVA) and The Royal Society of

Sciences at Uppsala. He received the Tage Erlander prize for natural sciences and technology in 2017 and the Arnberg prize in 2016, both awarded by the Royal Swedish Academy of Sciences (KVA). In 2013 he received the best PhD thesis award by The European Association for Signal Processing. He is member program management group for the AI branch of the Wallenberg AI, Autonomous Systems and Software Program (WASP). He leads the initiative on “AI for the sciences” currently evolving at Uppsala University. More information about his research can be found on his website: user.it.uu.se/~thosc112

Aurore Belfrage

Member of the Panel

Tech entrepreneur, political advisor and investor Aurore Belfrage spends her time in the intersection of Artificial Intelligence and international affairs. She’s an Industrial Advisor to Europe’s leading PE house EQT, she’s a columnist with leading Swedish daily Svenska Dagbladet (SvD) and a contributor to Politico, she writes, vlogs and hosts a podcast on pressing is-

ssues like the environment, geopolitics, ethics, governance and labor/future of work. Born in London, raised partly there as well as in Saudi and Sweden, with previous lives in venture capital with EQT Ventures, scrap dealing at Stena Metall, speech-writing and attempts at stand up comedy. Follow her on Twitter @aurorebelfrage or her blog iAubergine.com.

Also participating in the panel discussion: Hiroaki Kitano, Ross D. King, Andreas Theodorou & Eran Segal.