The Fourth STS *forum* European Workshop

THURSDAY, MAY 16, 2019 14.00–19.00 BIOMEDICUM AT KAROLINSKA INSTITUTET



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Introduction

The Science and Technology in Society (STS) *forum* held its inaugural meeting in the fall of 2004, to provide leaders from different areas academia, research, industry and policy-making, in order to candidly and openly discuss the progress of science and technology and its impact on the future of humankind. After 15 successful Annual Meetings in Kyoto, Japan, the STS *forum*, referred to as "the Davos for science and technology," has developed into a true movement of committed leaders from around the world. Typically, the Annual Meeting gathers approximately 1,400 people from 80 or more countries and regions, including 10-15 Nobel Laureates, 100 or more top executives from major corporations,

In its effort for local outreach to different regions in the world, the STS *forum* has been, in addition to its Annual Meeting, developing local/regional workshops in the past several years: the United States (organized by the "American Associates of the STS *forum*" – a 501(c)3 organization, established to support the activities of the STS *forum*), India, ASEAN countries, and Europe. In this context, this Fourth Edition of the European Workshop is organized in Stockholm with the support of the Karolinska Institutet, where it takes place, with JETRO (Japan External Trade Organization) as a joint organizer.

The STS *forum* Fourth European of May 16, 2019, will focus on the application of information, communication technologies (ICT), and more recently of artificial intelligence (AI) in the area of health and medicine. While the exponential progress in data processing technologies enabled unforeseen advancement in genetics and molecular biology, leading to a totally new area in medical research, communications technologies in combination of robotics also led the way to telemedicine, and the dispensing of medical monitoring or medical treatment in remote areas. With the surge in big data and its culmination in the development of artificial intelligence, its application in the medical area, such as faster, cheaper and more accurate pre-diagnostic is presenting true opportunities.

The beauty of these opportunities is that they can be beneficial both to developing countries as well as developed countries. They also present an extremely effective tool in response to growing healthcare needs of aging populations. In this workshop, we will try to identify the true opportunities of the application of these technologies, while we will also focus on the pre-requisite for these opportunities to be fully in operation. We will also see what the inherent risks involved in this deployment are, and how to prevent them.

Organizer



With the support by





About the STS forum SCIENCE AND TECHNOLOGY IN SOCIETY FORUM: LIGHTS AND SHADOWS

The explosive progress of science and technology up to the 20th century brought prosperity and enriched the quality of life for much of mankind.

However, the advance of science and technology raises important ethical, safety and environmental issues: possible negative applications are threatening mankind's own future. Since progress in science and technology is expected to accelerate and will be necessary for sustainable human development in the 21st century, wisdom must be exercised to keep it under proper control.

In that sense, the most pressing problems we face today include harmonising economic development with global warming; preventing terrorism; controlling infectious diseases; and assessing the potential health benefits and ethical factors relating to cloning technology. International efforts to address these problems are needed now more than ever. This is really what symbolises the 'lights and shadows of science and technology'. Opportunities need to be taken, but the risks must also be controlled. Health, meeting energy needs, and many other aspects of human welfare are dependent on continued progress in science and technology.

At the same time, the benefits of science and technology are not reaching a major part of the world's people. The barriers to seizing the opportunities for using science and technology to solve the problems of humankind need to be discussed.

Because the problems we face today are becoming increasingly complex against the backdrop of globalisation and international competition, they are beyond the control of any single country.

These issues are also beyond the control of the scientific community alone, because many of the problems will find solutions through changes in social systems, international collaboration, global networks, and the building of common rules.

The time has come for not only scholars and researchers, but also policy-makers, business leaders and media leaders from all over the world to meet and discuss science and technology issues in the 21st century.

The Science and Technology in Society (STS) *forum* aims to provide a new mechanism for open discussions on an informal basis, and to build a human network that would, in time, resolve the new types of problems stemming from the application of science and technology. The forum community will also explore the opportunities arising from science and technology, and address how to remove the barriers to using science and technology to solve the problems facing humankind.

Forum members are expected to participate, not as representatives of their country or organisation, but as individuals expressing their own views. This forum is not necessarily a platform for specialists to unilaterally convey their knowledge, but rather an opportunity for real dialogue among peers. Participants should also undertake cross-border activities towards the establishment of shared values and commitment for the future.

The STS *forum* has been founded and chaired by the former Japanese Minister Koji OMI.

More information is available on www.stsforum.org.

About JETRO

JETRO, or the Japan External Trade Organization, is a government-related organization that works to promote mutual trade and investment between Japan and the rest of the world. JETRO has a global network spanning over 74 regional offices abroad(54 countries) and 47 offices within Japan consisting of JETRO Tokyo Headquarters, JETRO Osaka, the Institute of Developing Economies (IDE-JETRO) and domestic regional offices. Using this network, JETRO contributes to two-way expansion of trade and investment between Japan and the rest of the world with its ability to connect between business and government, business and business and people and people.

Specifically, JETRO implements activities based on the following three pillars:

- 1 Facilitating innovation through inward FDI in Japan and support for overseas expansion of startups
- 1-1 Promoting Foreign Direct Investment into Japan
- 1-2 Support for overseas expansion of Japanese startups
- 2 Supporting exports of Japanese agricultural, forestry, fishery and food products
- 3 Supporting the overseas businesses of Japanese companies
- 4 Contributing to the activities and trade policies of Japanese companies through surveys and research

With the key message "Talk to JETRO first", JETRO provides multifaceted support, including one-stop services, as the first contact point for overseas companies interested in expansion to Japan.

About Karolinska Institutet

A MEDICAL UNIVERSITY

- Karolinska Institutet ranks consistently among the top 50 universities in the world. Founded in 1810 as an academy for army surgeons, the institution is today a modern medical university with the vision to advance knowledge about life and strive towards better health for all.
- The university accounts for the largest share of academic medical research conducted in Sweden and offers the country's broadest range of education in medicine and health sciences. Research spans the entire medical field, from basic experimental research to patientoriented and healthcare sciences research.
- With a close relationship to the clinical milieu, a well-established infra structure and stable finances, Karolinska Institutet has all the prerequisites to sustain high-quality research and education.
- In his will dated November 27, 1895, Alfred Nobel appointed Karolinska Institutet to award the Nobel Prize in Physiology or Medicine. This honourable mission is today executed by the Nobel Assembly at Karolinska Institutet fifty professors currently working at the university. This assignment has given the university a broad international contact network in the medical science community. Every year, researchers at Karolinska Institutet co-publish around 3,800 scientific articles with their international fellows.
- Times Higher Education ranks Karolinska Institutet as the 40th best university in the world (2018/2019) and as number ten in the subject of Clinical, Pre-Clinical and Health (2017/2018). The Academic Ranking of World Universities lists Karolinska Institutet as number 44 in the world, number 19 in Clinical Medicine and number 5 in Public Health Sciences (2018).

Program

Time	Agenda		
13:15 - 14:00	Registration		
14:00 - 14:10	Welcome Remarks:		
	Prof. Ole Petter Ottersen	President, Karolinska Institutet, Sweden <8min>	
14:10 - 14:15	Opening Address:		
	Mr. Koji Omi	Founder and Chairman, STS <i>forum</i> , Japan <5min>	
14:15 - 15:40	Session 1 "ICT as a Solution for Health and Wellbeing" <85 min>		
	Chair Dr. Henry A. McKinnell	Chairman Emeritus, Pfizer U.S.A.	
	Presentation from Speakers	<30-40 min>	
	Dr. Matthias Ekman	Director Industry Solutions, Microsoft, U.S.A.	
	Prof. Elena Fersman	Research Director, Artificial Intelligence, Ericsson, Sweden	
	Dr. Michinari Hamaguchi	President, Japan Science and Technology Agency (JST), Japan	
	Mr. Hans Erik Henriksen	Chief Executive Officer, Healthcare DENMARK, Denmark	
	Prof. Sabine Koch	Strategic Professor of Health Informatics at Karolinska Institutet and the Director of HIC, the Health Informatics Centre, Sweden	
	Dr. Carsten C. Mahrenholz	Founder and CEO, COLDPLASMATECH GmbH, Germany	
	Discussion among panelists and with audience <40 min>		
	Wrap up <5-10 min>		
15:40 - 16:00	Coffee Break		

Time	Agenda		
16:00 - 17:25	Session 2 "Application of AI in the Medical Area: Opportunities and Risks" <85 min>		
	Chair Prof. Motoko Kotani	Executive Director, RIKEN, Japan	
	Presentation from Speakers –	<30 min>	
	Prof. Patrick Flandrin	Vice President, French Academy of Sciences, France	
	Dr. Niklas Juth	Associate Professor in Medical Ethics, Karolinska Institutet, Sweden	
	Prof. Johan Lundin	Professor, Karolinska Institutet, Sweden	
	Prof. Carolina Wählby	Professor, Dept. of Information Technology Uppsala University, Sweden	
	Ms. Sonoko Watanabe	Deputy Director-General, Science and Technology Bureau, Ministry of Education, Culture, Sports, Science and Technology (MEXT) Japan	
	Discussion among panelists and with audience	e <40 min>	
	Wrap up <5-10 min>		
17:25-17:40	Closing Remarks		
	Mr. Yasukazu Irino	Executive Vice President, Japan External Trade Organization (JETRO), Japan	
	Prof. Jerzy Duszyński	President, Polish Academy of Sciences (PAS), Poland	
17:40 – 19:00	Networking Cocktail		

Welcome Remarks



PROF. OLE PETTER OTTERSEN

President Karolinska Institutet. Sweden

Ole Petter Ottersen has been President of Karolinska Institutet since August 2017, and previously served as President of the University of Oslo (2009-2017). As a neuroscientist, physician and academic leader, Ottersen has held numerous positions of trust. Between 2013 and 2015, he was head of the Norwegian Association of Higher Education Institutions and of the Nordic University Association. Ottersen served as chairman of the board for Norway's National Program for Functional Genomics (2003-2007), as director of Norway's Centre of Excellence in Molecular Biology and Neuroscience (2002-2009) and as coordinator of the Nordic Centre of Excellence in Molecular Medicine (2005-2009). He has also coordinated two projects under the EU Framework Program and was the panel leader for European Research Council Advanced Grants (2008-2012). He is currently the panel leader for ERC Synergy Grants. In recent years, he has been engaged in global health much inspired by his experiences as Chair of the Lancet-University of Oslo Commission on Global Governance for Health (2011-2014) - and currently serves as a board member of the African Population and Health Research Center (APHRC) based in Nairobi. Between 2006 and 2009, Ottersen was Chief Editor of Neuroscience, the official journal of the International Brain Research Organization, and has also served on numerous boards and prize committees, including the Kavli Prize Committee in Neuroscience and the Thon Foundation Advisory Board. At the University of Oslo, Ottersen was Dean of Science within the medical faculty (2000-2002) and has taught medical students, physiotherapists and postgraduate students since 1976.

Opening Address



MR. KOJI OMI

Founder and Chairman Science and Technology in Society *forum* (STS *forum*); former Minister of Finance. Japan

After graduation from Hitotsubashi University, Koji Omi joined the Ministry of International Trade and Industry (MITI) in 1956 and served as Consul at Consulate in New York; Director, South Asia & Eastern Europe Div. Trade Policy Bureau; Director, Admin. Div. Science and Technology Agency; Director-General, Guidance Dept. Small & Medium Enterprise Agency. He was elected in 1983 for House of Representatives and served as Minister of Finance (2006–07), Minister of State for S&T Policy for Okinawa and Northern Territories Affairs (2001–02), and Minister of State for Economic Planning (1997–98). He played a central role in enacting the Fundamental Law of S&T in 1995 and the founding of the Okinawa Institute of Science and Technology. In 2004 he founded the Science and Technology in Society *forum* (STS *forum*). Koji Omi was awarded honorary doctorates from Universiti Teknologi Malaysia (UTM) in 2013, Univ. of York in January 2014, Univ. of Quebec in June 2014, and Okinawa Institute of Science and Technology (OIST) in February 2018.

Session 1 CHAIR



DR. HENRY A. MCKINNELL

Chairman Emeritus Pfizer Inc. U.S.A. Council Member of STS *forum*

Hank McKinnell is Chairman and Co-founder of the Academic Alliance Foundation, an organization dedicated to fighting infectious diseases in Africa by strengthening academic medical centers and building healthcare capacity through research, training, prevention, care, and treatment. Hank joined Pfizer Inc. in 1971 in Tokyo and over the years held positions of increasing responsibility around the world including serving as Chairman and CEO. Hank is currently the Chairman of Moody's Corporation and is a Director of several life science companies. Hank holds a Bachelor's Degree in business from the University of B.C., and M.B.A. and Ph.D. degrees from the Stanford University Graduate School of Business. Recipient Grand Cordon of the Order of the Rising Sun.

SPEAKERS



DR. MATTHIAS EKMAN Director Industry Solutions

Microsoft. U.S.A.

Mathias Ekman is Director Industry Solutions Executive for Health and Life Science at Microsoft Western Europe. His role is to work with key stakeholders at Governments as well as innovative start-ups to accelerate the digital transformation. The goal is together with the partner ecosystem democratize AI and clinical knowledge in order to address some of the hardest challenges in society. He joined Microsoft in 2014, prio to this he held several leading positions at different consultant companies working with clients in the field of connected vehicle, advanced analytics in the financial sector as well establishing solution for screening of colorectal cancer. Mathias holds a PhD in Theoretical Physics focusing on large scale computing for solving problems explained by quantum physics.



PROF. ELENA FERSMAN

Research Director, Artificial Intelligence Ericsson. Sweden

Elena Fersman is a Research Director in Artificial Intelligence at Ericsson. She is responsible of a team of 100+ researchers located in Sweden, US, India, Hungary and Brazil. She is also a docent and an adjunct professor in Cyber-Physical Systems specialized in Automation at the Royal Institute of Technology in Stockholm. She holds a PhD in Computer Science from Uppsala University, a Master of Science in Economics and Management from St. Petersburg Polytechnic University and did a postdoc at the University Paris-Saclay. At Ericsson, she had various positions ranging from product management to research leadership. Her current research interests include automation of knowledge-intensive cyber-physical systems. Elena has co-authored over 50 patent families.

DR. MICHINARI HAMAGUCHI



President Japan Science and Technology Agency (JST), Japan Council Member of STS *forum*

Michinari Hamaguchi earned his PhD in Medicine from Nagoya University. He was appointed Research Associate at the Nagoya University School of Medicine in 1980, and since then, he had been working at Nagoya University, except for the time he pursued his research at the Rockefeller University in the U.S. from 1985–1988. He served as the President of Nagoya University from Apr 2009 to Mar 2015 before becoming the President of JST in Oct 2015. His scholarly interest is Pathological Medical Chemistry. He currently serves as Chairperson of the Council for Science and Technology, Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan.



MR. HANS ERIK HENRIKSEN

Chief Executive Officer Healthcare DENMARK, Denmark

Hans Erik Henriksen is CEO of Healthcare DENMARK. Healthcare DENMARK is a public-private partnership organization, with a national mandate to promote Danish healthcare solutions and competencies abroad. He has a solid healthcare background from different executive positions during the latest 20 years. He was responsible for IBM Healthcare and Life Sciences in the Northern and Eastern part of Europe (the countries U.K., Ireland, South Africa, Germany, Austria, Switzerland, the Nordic Countries and Central and Eastern Europe). Since 2008 he has also been engaged as board member in a number of different healthcare and healthcare-IT companies. During 2012 he was a member of the Danish Governments Growth team for Healthcare and welfare solutions.



PROF. SABINE KOCH

Strategic Professor Health Informatics Centre, LIME Karolinska Institutet. Sweden

Sabine Koch is the Strategic Professor of Health Informatics at Karolinska Institutet in Stockholm, Sweden and director of its Health Informatics Centre. Dr. Koch received both a M.Sc. and a Ph.D. degree in Medical Informatics from Ruprecht-Karls University Heidelberg, Germany. Her fields of interest include models for collaborative care, especially homecare, human factors/ usability and evaluation of information systems. Current research concerns a socio-technical perspective on integrating health, social and selfcare but also guideline-based clinical decision support and information visualization for enhanced decision making. Dr. Koch is the President-elect of the International Medical Informatics Association (IMIA) and Editor-in-Chief of Methods of Information in Medicine.

DR. CARSTEN C. MAHRENHOLZ



Founder and CEO COLDPLASMATECH GmbH. Germany

Dr. Mahrenholz studied biology and received his PhD in chemistry alongside an MBA from universities in Berlin and Cambridge. After working as a consultant for SMEs and scientific institutions, he became CEO of a high-tech-transfer company. He co-founded COLDPLASMATECH GmbH in 2015 and became a pioneer in plasma medicine. This team developed a Star- Trek-like medical device for treating chronic wounds and killing multiresistant bacteria. Amongst various awards and prizes for business, innovation and technology, they received the IQ innovation award, the Leibniz Founder Prize and the German Innovation Award 2018. He recently entered the Hall of Fame at the Entrepreneur of the Year award (and was nominated 2016 and 2017) and is one of the first LAB fellows of the Nobel Laureate Meetings.

Session 2 CHAIR



PROF. MOTOKO KOTANI

Executive Director RIKEN, Japan

Director, Professor and Principal Investigator of the WPI Advanced Institute for Materials Research (WPI-AIMR) and Professor, Mathematical Institute, Graduate School of Science at Tohoku University, Motoko Kotani specializes in geometry, especially, discrete geometric analysis. She received the 25th Saruhashi Prize for her contribution to Discrete Geometric Analysis on crystal lattice. She is an executive member of the Council for Science, Technology and Innovation, and the Cabinet Office, a member of the Science Council of Japan, the President of the Mathematical Society of Japan, and Associate Executive Vice President (Research) of Tohoku University. She was appointed Executive Director of RIKEN in April 2017.

SPEAKERS



PROF. PATRICK FLANDRIN

Vice President French Academy of Sciences. France

Patrick Flandrin obtained his PhD from INP Grenoble, France (1982). He is currently a CNRS senior scientist, working within the Physics Department of ENS de Lyon since 1991. His research interests include mainly nonstationary signal processing, time-frequency/wavelet methods, scaling stochastic processes and complex systems. Dr. Flandrin was awarded the Philip Morris Scientific Prize in Mathematics (1991), the SPIE Wavelet Pioneer Award (2001), the Prix Michel Monpetit from the French Academy of Sciences (2001), the Silver Medal from CNRS (2010), and the Technical Achievement Award from the IEEE Signal Processing Society (2017). He is a Fellow of the IEEE (2002) and of EURASIP (2009). Elected member of the French Academy of Sciences in 2010, he is currently its Vice-president.

DR. NIKLAS JUTH



Associate Professor Medical Ethics, Karolinska Institutet. Sweden

Niklas Juth is associate professor in medical ethics at Karolinska institutet. His main research interests are in ethics and bioethics, genethics, and the intersection between political philosophy and medical ethics, e.g. autonomy and justice in health care, where he has published extensively. He is involved in the Stockholm Centre for Health Care Ethics (CHE) project "Prioritizing in Health Care: The Reasonableness and Applicability of the Principles of Cost-Efficiency, Need, and Responsibility". He has also published within the areas of experimental ethics, victims of honor related threats within health care, end-of-life care, screening, genethics and health care complaints. He is teaching medical ethics and philosophy of science at all levels at Karolinska institutet.



PROF. JOHAN LUNDIN Professor

Karolinska Institutet. Sweden

Johan Lundin, MD, PhD is a Professor of Medical Technology at Karolinska Institutet, Stockholm and a Research Director at the Institute for Molecular Medicine Finland (FIMM), University of Helsinki. His overall research aims are to study the use of digital technologies and artificial intelligence for improvement of diagnostics and care of the individual patient. In addition to the research, Dr. Lundin has together with his research group at FIMM and researchers at Karolinska Institutet developed technologies for digital pathology and diagnostic decision support, for example cloud-based and mobile solutions. Dr. Lundin will give a brief overview of opportunities and challenges in the development of deep learning algorithms for diagnostic purposes.



PROF. CAROLINA WÄHLBY

Professor Dept. of Information Technology Uppsala University. Sweden

Carolina Wählby is full professor at the Dept. of Information Technology, and director of the SciLifeLab BioImage Informatics facility, Uppsala University, Sweden. Her research is focused developing computational approaches, including machine learning and AI, for extracting information from image data with focus on medicine and life science, funded by the ERC and the Swedish Foundation for Strategic research. She was elected ISAC scholar 2014, received the SBI2 President's innovation award in 2014, and the Thuréus prize in 2015. She is a member of the Royal Society of Sciences at Uppsala and the Royal Swedish Academy of Engineering Sciences. She was at the Broad Institute of Harvard and MIT 2009-2015, developing CellProfiler, and became full professor at Uppsala University in 2014.

MS. SONOKO WATANABE



Deputy Director-General Science and Technology Bureau Ministry of Education, Culture, Sports, Science and Technology, Japan

Ms. Sonoko Watanabe took up her duty as Deputy Assistant Minister/Deputy Director-General, Science and Technology Policy Bureau, Ministry of Education, Culture, Sports, Science and Technology (MEXT) in August 2018. Prior to assigning to the Japanese Government, she was an Executive Director of the JAEA from 2017 to 2018. She was responsible for the policy formulation at various positions in the Japanese Government for more than 25 years, mainly in the fields of science and technology such as life science, computational science, outer space, atomic energy, and so on. She has a degree in biology from Nara Women's University.

Closing



MR. YASUKAZU IRINO

Executive Vice President Japan External Trade Organization (JETRO), Japan

Mr. Yasukazu Irino has been Executive Vice President , Japan External Trade Organization(JETRO) since October 2017. Prior to this, he served as Deputy Director-General for Trade Policy, Trade Policy Bureau, Ministry of Economy, Trade and Industry (METI). Mr. Irino graduated with a Law degree from Tokyo University and upon graduation he joined METI in 1987. After then, he has held various positions including experience working overseas as visiting fellow at Stanford University in the US and Commercial Counsellor at Embassy of Japan in UK, Head of Singapore Office, Chief Representative for Asia and Oceania at NEXI Singapore, assigned by Ministry of Economy, Trade and Industry (METI).



PROF. JERZY DUSZYŃSKI

President Polish Academy of Sciences (PAS). Poland Council Member of STS *forum*

Professor Jerzy Duszynski President - Polish Academy of Sciences (2015) Corresponding Member of the Academy of Sciences since 2007 and professor at the Nencki Institute of Experimental Biology. Professor's research interests are bioenergetics, role of mitochondria in cell functioning, mitochondrial and neurodegenerative diseases, and ageing. In 2008-09 served as Undersecretary of State at the Ministry of Science and Higher Education and President of the Interdisciplinary Committee of the Infrastructure Research at the Ministry of Science and Higher Education (2006-09). In 2012 elected to the Academia Europaea, in 2013–16 member of the Institute for Research in Biomedicine in Barcelona Board of Trustees.