



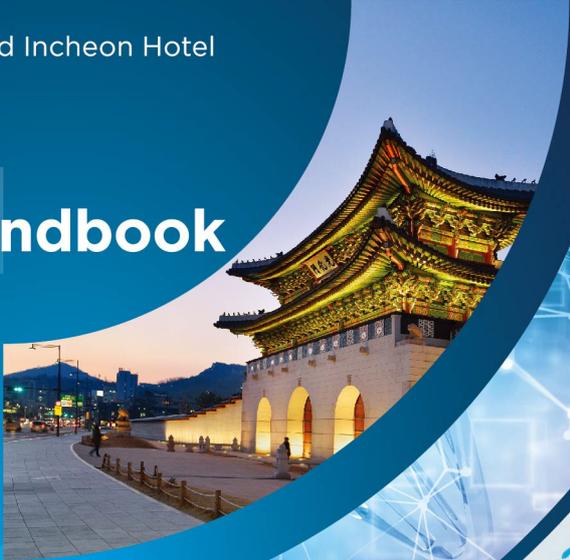
2019 IAP Conference

Science and the Sustainable Development Goals (SDGs):
The Role of Academies

9-10 April 2019

Grand Ballroom, Sheraton Grand Incheon Hotel
Songdo, Incheon, Korea

Conference Handbook



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2019 Conference. 9-10 April 2019, Incheon, Korea.
Science and the Sustainable Development Goals: The Role of Academies



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WELCOME BY KAST PRESIDENT

Eminent representatives of Academies, distinguished speakers and guests, it is my pleasure and honor to welcome you to IAP Conference and General Assembly. A special word of warm thanks to the speakers who have traveled from abroad to join us in Korea and I would like express sincere gratitude to scientific committee of IAP for their dedication.

The Korean Academy of Science and Technology (KAST) has been playing a leading role in the field of science and technology at home and abroad by addressing key issues taking place in domestic and international societies through providing advice based upon evidence-based science and technology and active participation.

As part of such efforts, the KAST decided to host 2019 IAP Conference and General Assembly, and has been doing its best to make perfect preparations for this wonderful events.

As you are well aware, UN and international society set Sustainable Development Goals (SDGs) to solve mankind's common issues such as global environment, economic and social issues, and both developed and developing countries have been pursuing common international programs together. Lots of global companies already internalized SDGs in their business strategies, and science and technology circle is also making efforts to implement Sustainable Development Goals in this ever-changing society.

Science and technology are a key factor for achieving SDGs. In particular, amid this fast changing environment of science and technology driven by the 4th Industrial Revolution, I believe that science and technology community needs to more proactively engage in implementing SDGs. For this, the KAST would like to kick off in-depth discussions on the role of each country's science and technology academy and field under the theme of 'Science and the Sustainable Development Goals: The Role of Academies', together with InterAcademy Partnership.

I am sure that this Conference will become an important occasion where prestigious experts from all over the world invited by Scientific Committee of IAP get together and review the progress made to achieve SDGs and discuss future ways to move forward.

I hope your participation in IAP Conference and General Assembly will be rewarding and again express my true appreciation for your enthusiasm.

Thank you.

Prof. Min-Koo Han, Ph.D
President,

The Korean Academy of Science and Technology



THE KOREAN ACADEMY OF SCIENCE AND TECHNOLOGY

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KAST 한국과학기술원
The Korean Academy of Science and Technology

The Korean Academy of Science and Technology (KAST) is an organization of the most distinguished and eminent scholars established in 1994. KAST has successfully contributed to promote science and technology through active participation of its members. Approximately 1,000 members* are nominated and elected by their peers in recognition of distinguished achievement in their respective fields in both Korea and international

communities. Members work internationally and intimately with academies of sciences and distinguished foreign associates.

Since its foundation, KAST has been carrying out a wide range of activities in the areas of science and technology. One of the main activities is that KAST performs public policy studies and impacts policymaking through evidence-based advice and publications including "Voice of the KAST." KAST promotes basic science and nurture talents, especially among young students. In order to encourage discussion on important scientific and societal topics, KAST has a variety of forums such as KAST Roundtable Discussions, KAST Science and Technology Forums, and KAST International Symposium. Moreover, KAST is taking the lead in citizen diplomacy in science and technology by fostering international collaboration with academies of other countries.

In addition, KAST operates the Young Korean Academy of Science and Technology (Y-KAST) established in February 2017 in order to find ways to support outstanding young scientists to communicate and collaborate with leading scientists from all over the world. Members of Y-KAST are composed of young scientists under the age of 45. Y-KAST is working with great enthusiasm to further encourage young researchers to network and share their knowledge with members of National Young Academies abroad.

*Members of KAST currently consist of 485 Fellows, 429 Fellow Emeritus, 74 Foreign members, 9 Honorary and Patron members, and 125 Y-KAST members.



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WELCOME BY IAP PRESIDENTS

Three years ago, the largest ever gathering of the world's merit-based academies was convened in Hermanus, South Africa. At that meeting, during the General Assembly, we all agreed to bring our three inter-academy networks (then known as IAP, IAC and IAMP) under a single umbrella – the InterAcademy Partnership. Since then, IAP has made great strides forward: in harmonising our strategies, operations and outreach; in consolidating the efforts of our member academies and our regional networks; and undertaking high-profile global projects that have fully engaged our members and raised our profile in the international science-policy arena. The 'Food and Nutrition Security and Agriculture' project funded by the German Federal Ministry for Education and Research (BMBF) and the two projects funded by the Carnegie Corporation of New York, on 'Harnessing SEM to Address Africa's Challenges' and 'Improving Scientific Input to Global Policymaking' are testament to this. Also in Hermanus, we held a very successful conference on 'Science Advice' that concluded with a series of recommendations*, on which we continue to build.

The present IAP triennial conference on 'Science and the Sustainable Development Goals: The role of academies', for which some 60 academies will convene, provides us with a further opportunity for self-reflection: to celebrate our achievements over the past three years; to reflect on lessons learned and ways we can continue to improve, including through building the capacity our members; and to identify new opportunities for strengthening the voice of science at global, regional and national levels.

During these next two days, we will explore the role of the academies through the lens of the UN Sustainable Development Goals (SDGs), hearing from policy practitioners, leading scientists working at the science-policy interface, and colleagues in the academies who are successfully engaging with the SDGs in their own countries and who have been working on IAP and other academy projects highly relevant to these goals. It is important to highlight that policy design and implementation generally take place at the national level, so that national academy action is critical. IAP's strength lies in its national and regional-level reach. The value and potential impact of IAP activities, including this conference, therefore, depend on member academies' ownership of, and contributions to, those collective activities.

We would like to extend our sincere thanks to our guest speakers and moderators, and to acknowledge the work of the members of our Scientific Committee who helped design the conference agenda. We are especially grateful to our hosts, the Korean Academy of Science and Technology (KAST) for their gracious and generous hospitality, especially Past President Professor Myung Chul Lee, for his support in making initial arrangements, and current president, Professor Min Koo Han, who has worked so hard to host this meeting. Our thanks also go out to all the staff of KAST and the IAP secretariat staff in Trieste, Washington and London for their work and dedication to realise this important event.

With the valuable inputs and interactions among our member academies over the next two days, it is expected that the outcomes of this meeting will help IAP strengthen its role in the global science-policy environment through the coming years.

Prof. Volker ter Meulen
Prof. Depai Liu
Presidents,
IAP



*www.interacademies.org/29857/Summary-of-the-IAP-Conference-on-Science-Advice

THE INTERACADEMY PARTNERSHIP

www.interacademies.org
iap@twas.org



The InterAcademy Partnership (IAP) was formally launched in South Africa in March 2016, bringing together three established networks of academies of science, medicine and engineering, namely IAP, the global network of science academies, the InterAcademy Medical Panel (IAMP) and the InterAcademy Council (IAC). Under the umbrella of IAP, more

than 130 national and regional member academies work together to support the vital role of science and its efforts to seek solutions to address the world's most challenging problems. In particular, IAP harnesses the expertise of the world's scientific, medical and engineering leaders to advance sound policies, improve public health, promote excellence in science education, and achieve other critical development goals.

The work of the world's academies of science and medicine has resulted in lives saved, better education, and more effective policy approaches to a range of issues. Academies are typically independent and highly committed institutions that recognize and promote excellence and achievement. By definition, they are merit-based, with members selected from among the leading scientific minds within a country or region. In addition to their honorific roles, academies are vital civil society institutions that have the credibility to inform the public and policy-makers about problems and potential solutions. Their credibility comes not only from the scientific excellence of their members, but also from the fact that they are free of vested political and commercial interests. Indeed, although many academies were established by national governments and tasked with serving their countries by, among other things, bringing scientific perspectives to bear on national and international issues, they were also constituted as independent bodies.

Just as each IAP member academy represents an authoritative voice nationally, this unified voice of academies under IAP aims to have great impact at the international level. Now, as international attention has turned to the UN's Sustainable Development Goals, IAP provides a collective mechanism and voice for science academies to further strengthen their crucial roles as providers of evidence-based policy and advice to national governments and inter-governmental organizations, including the UN. IAP also uses the expertise of its leading members to assist in building the capacity of its less-experienced and newest members, thus strengthening their ability to take on an advisory role in their own nations and to contribute to global discussions.

The three pillars of the InterAcademy Partnership include the three original academy networks, namely: IAP for Science; IAP for Health; and IAP for Policy. IAP's member academies, who work together in regional networks in Africa, the Americas, the Asia/Pacific region and Europe (i.e. NASAC, IANAS, AASSA and EASAC), form the intellectual core of the partnership and are responsible for electing the leadership. Elections are typically carried out at a General Assembly of members held every three years. Each of the 'three pillar' networks has its own Executive Committee led by two co-chairs – one from a developed country and one from a developing country. Together these six co-chairs make up the IAP Steering Committee. They are joined on the 10-member IAP Board by representatives of the four regional networks.

The secretariat of IAP for Science and IAP for Health is hosted by The World Academy of Sciences (TWAS) at its headquarters in Trieste, Italy, while the secretariat of IAP for Research is hosted by the US National Academies of Science, Engineering and Medicine (NASEM) in Washington DC.



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IAP 2019 CONFERENCE - PROGRAMME

Objectives of conference:

1. to understand the role of science in supporting the UN's Sustainable Development Goals (SDGs), the imperative for the global science community to support them, and the transformation in science required to realize them;
2. to look at how national science academies are supporting the implementation of the SDGs, what they can learn from this process and from each other;
3. to explore opportunities for engagement in the UN system;
4. to consider how academies can respond to increasing demands and expectations placed on the science community;
5. to explore two thematic case studies as learning tools for engaging with the SDGs;
6. to agree a set of actions that academies can implement in their own national and regional contexts.

9 APRIL 2019

Objective: Our moderators, Professor Ryan Song and Dr Ed Gerstner, will introduce themselves, and our generous host, KAST (Professor Min-Koo Han) and convenors, IAP (Professors Volker ter Meulen and Depei Liu), who will then welcome all participants to the conference and set out the broad objectives for the next two days.

9:00-9:15	Opening Ceremony	Professor Min-Koo Han , President, KAST Professor Volker ter Meulen and Professor Depei Liu , Co-Presidents IAP
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SESSION 1: PUTTING SCIENCE AND THE SDGS IN PERSPECTIVE

Moderators: Professor Ryan (Seryeon) Song, Kyung Hee University and Dr. Ed Gerstner (Director of Journal Policy and Strategy, Springer Nature)

Objective 1: to understand the role of science in supporting the UN's Sustainable Development Goals (SDGs), the imperative for the global science community to support them, and the transformation in science required to realize them.

Format: a keynote and three speakers, followed by Q&A and open discussion with all conference participants.

Questions for all participants to consider:

- How must science respond to the changing nature of global challenges and to policymaking that is fit-for-purpose to address to them?
- What does reported progress on the SDGs tell us about challenges, capacities, complexities and priorities, and how these compare geographically?
- Do we have reliable ways of measuring the impact of science on finding solutions to meet the SDGs?
- How can the academies uniquely contribute to the global science community effort to support the SDGs?
- What have the academies learned from the IAP project focusing on the SDGs?

9:15-10.00	KEYNOTE: How can the global science community meet the challenge of the Sustainable Development Goals?	Professor Jacquie McGlade , Professor of Resilience and Sustainable Development, University College London, and Former UNEP Chief Scientist
10.00-10.15	Harnessing STI for the SDGs	Dr. E. William Colglazier , Editor-in-Chief of Science & Diplomacy
10.15-10.30	The IAP project "Improving scientific input to global policymaking"	Professor Eva Alisic , IAP Project Co-Chair, the IAP SDGs project
10:30-11.00	Discussion	
11:00-11:30	COFFEE BREAK & PHOTOGRAPH	

SESSION 2: THE ROLE OF ACADEMIES IN SUPPORTING THE SDGS: WHAT CAN WE LEARN FROM EACH OTHER?

Moderators: Professor Ryan Song and Dr Ed Gerstner

Objective 2: to explore how national science academies are supporting the implementation of the SDGs, what they can learn from this process and from each other.

Format: 5-minute reflections, followed by moderated panel discussion, Q&A and open discussion with all conference participants, including from other academies who have interesting examples to share.

Academy representatives ("case studies") each to address:

- How their academy is engaging with the SDGs;
- How this was initiated;
- How they are engaging their membership;
- The anticipated (potential) impact of this engagement;
- What their academy is learning.

Questions for all participants to consider:

- What are the key challenges, opportunities and lessons learned from current engagement on the SDGs?
- What are the necessary requirements for academy engagement (nationally and regionally)?
- Could any of these examples apply to other academy contexts, or do they spark other ideas for ways of engaging? If not, what is preventing this?
- How can communication and collaboration between basic scientists, applied scientists, engineers, social scientists, policy makers and business be improved?



11.30-13.00	National case studies in the Americas	Professor Roberto Williams , President, National Academy of Exact, Physical and Natural Sciences, Argentina Professor Luiz Davidovich , President, Brazilian Academy of Sciences
	National case studies in Africa	Professor Himla Soodyall , Executive Officer, Academy of Science of South Africa (ASSAf)
	National case studies in Asia	Professor Ranjith Mahindapala , President, National Academy of Sciences, Sri Lanka Professor Hye-Yeong Chun , KAST
	EASAC and the Sustainable Development Goals	Professor Thierry Courvoisier
	Engaging with the SDGs: a Global Young Academy perspective	Professor Yoko Shimpuku , Associate Professor, Kyoto University, Japan
	Discussion	
13.00-14.00	LUNCH	
SESSION 3: OPPORTUNITIES FOR ENGAGEMENT IN THE UN SYSTEM Moderators: Professor Ryan Song and Dr. Ed Gerstner Objective 3: to explore opportunities for engagement in the UN system. Format: three speakers, followed by Q&A and open discussion with all conference participants. Questions for all participants to consider:		
<ul style="list-style-type: none"> How can the academies best support existing processes/mechanisms for applying science to the SDGs? Where are the most fruitful entry points in the UN system for the academies to engage optimally? What/where are the challenges and opportunities for engaging in these processes? 		
14.00-14.20	The collaboration of the Korean academies with UNFCCC to support the implementation of SDG5 and SDG13	Dr. Changmo Sung , Visiting Professor, Korea University
14.20-14.40	Working with UN Regional Commissions	Dr. Katinka Weinberger , Chief, Environment and Development Policy, UN Economic and Social Commission for Asia and the Pacific (UNESCAP)
14.40-15.00	Pathways to policy: Science in and for the UN	Dr. Heide Hackmann , CEO, International Science Council
15.00-15.30	Discussion	
15.30-16.00	COFFEE BREAK	
SESSION 4: HOW CAN ACADEMIES BETTER RESPOND TO THESE OPPORTUNITIES? Moderators: Professor Ryan Song and Dr. Ed Gerstner Objective 4: to consider how academies can respond to increasing demands and expectations placed on the science community. Format: three speakers, followed by Q&A and open discussion with the floor. Additional reference material: Merit-based academies in the 21 st century: a think piece. Questions for all participants to consider:		
<ul style="list-style-type: none"> How should academies respond to new and increasing demands and expectations of the science community? Are academies as fit-for-purpose as they could be? If not, what needs to change? What can senior and young academies and their members learn from each other? How will academies go about prioritising the objectives set out in the new IAP Strategic Plan? Which objectives speak most loudly to members? Is there a role for the academies to facilitate collaboration between basic scientists, applied scientists, engineers, social scientists, practitioners, policy makers, entrepreneurs and other civic stakeholders? 		
16.00-16.20	How can academies continue to be relevant in a fast-changing world?	Professor Rajae El Aouad , Working Group member, IAP SDGs project
16.20-16.40	The philosophy and practice of the young academies	Professor Tolu Oni , Co-Chair, Global Young Academy
16.40-17.00	IAP's strategic plan: an inter-academy road map to 2030?	Dr. Teresa Stoepler , Executive Director, IAP for Research, and Dr. Peter McGrath , Coordinator IAP
17.00-17.30	Discussion	
	CONFERENCE DINNER	

10 APRIL 2019

SESSION 5: THEMATIC CASE STUDY 1: IAP FOOD & NUTRITION SECURITY & AGRICULTURE (FNSA)

Moderators: Professor Mohamed Hassan (President, Sudanese National Academy of Sciences) and D.r Ed Gerstner

Objective 5(a): to discuss key conclusions from IAP's FNSA interregional project and to explore as a learning tool for engaging with the SDGs.

Note: in this case study, both technological *and* social (or behavioral) solutions are needed to inform policy.

Format: four speakers, followed by Q&A and open discussion with the floor.

Questions for all participants to consider:

- What do you view as the strongest messages for SDGs from this project? What is still controversial for FNSA? What FNSA knowledge gaps need to be filled?
- Where has the FNSA project received particular attention, and how has this been effected (evidence of impact)?
- To what extent and how can academies account for, and help influence, technological and/or social change?
- What lessons can be learned from the FNSA project – globally, regionally and nationally – in terms of content and design, perhaps especially in terms of interdependencies/ interactions between SDGs?
- What criteria should be applied for any next IAP interregional project?

9.00-9.10	Introduction	Professor Mohamed Hassan President, Sudanese National Academy of Sciences
9.10-9.30	Food and Nutrition Security and Agriculture report	Dr. Robin Fears , Director, Biosciences Programme, EASAC
9.30-9.50	Network of African Science Academies (NASAC)	Professor Sheryl Hendriks , Institute for Food, Nutrition and Well-being, University of Pretoria
9.50-10.10	Food and Nutrition Security and Agriculture: Perspectives from Asia	Professor Paul J. Moughan , Distinguished Professor, Massey University
10.10-10.40	COFFEE BREAK	
10.40-11.00	Food Security Prospective and Strategic Plan for Korea	Professor Hyun Jin Park , Dept. of Biotechnology, School of Life Sciences & Biotechnology, Korea University
11.00-11.20	Food and Nutrition Security and Agriculture: the IANAS report	Professor Jeremy McNeil , Co-chair, IANAS
11.20-12.00	Discussion	

12.00-13.15 LUNCH

SESSION 6: THEMATIC CASE STUDY 2: ARTIFICIAL INTELLIGENCE (AI)

Moderators: Professor Peggy Hamburg (Foreign Secretary, US National Academy of Medicine) and Professor Ryan Song

Objective 5(b): The development of AI represents a seminal event in human history, but much about it remains poorly understood and how its transformative potential will be applied remains to be determined. This session will examine opportunities to drive innovation and application in ways that will improve lives and support the SDGs in several key areas, while recognizing concerns about what this evolving technology may mean for the future of jobs, ethics and privacy, worsening inequality and other perceived threats.

Format: four speakers, followed by Q&A and open discussion with all conference participants.

Questions for all participants to consider:

- How can academies help support safe, trusted development of AI technologies, that maximize opportunities for beneficial applications and reduce likelihood of threats and misapplication?
- How can we better ensure equitable access to the benefits of these evolving capabilities?
- Can/should academies work with key stakeholders like policymakers, the public, industry and the media to enhance understanding and drive sound, data-driven policies and programs?
- How can the academies help identify important opportunities to apply AI approaches to achieve a broad set of the SDGs?

13.15-13.35	Cognitive AI and Incremental Machine Learning	Professor O.K. Baek , Research Fellow & Head, Federal Research Agency of Korea, ETRI
13.35-13.55	Smart Cities: digital solutions for a more livable future	Dr. Jeongmin Seong , McKinsey & Company
13.55-14.15	The promise of AI: transforming health systems from reactive to predictive, preventative and high performing	Dr. Ann Aerts , Head, Novartis Foundation
14.15-14.40	Discussion	

SPECIAL THEME: Moderator Dr Ed Gerstner		
14.40-15.00	The World Health Organisation (WHO) and science	Dr. Vasee Moorthy , Coordinator, Research, Ethics, Knowledge Uptake, WHO
15.00-15.30	COFFEE BREAK	
CONCLUDING SESSION: DISCUSSION PANEL: RESPONDING TO CHALLENGES FOR ACADEMIES IN A CHANGING WORLD Moderator: Dr. Ed Gerstner and Professor Ryan Song <u>Objective 6:</u> to agree a set of actions that academies can implement in their own national and regional contexts. <u>Format:</u> drawing on highlights from the past two days, a moderated panel discussion followed by open discussion with all conference participants. <u>Panel members representing each previous session:</u> <u>Questions to consider:</u> <ul style="list-style-type: none"> • How can academies keep up with the pace of social, political and technological change, and maximize opportunities available to them? • Might academies need to adapt or repurpose themselves in order to remain vital, relevant organizations in the 21st century? • What are the most promising actions academies can take, nationally and within their respective IAP regional networks, to better engage with the SDGs to 2030? • What are the key take home messages for participating academies, as a result of this conference? 		
Panellists: Professor Volker ter Meulen, IAP President Professor Jacqueline McGlade, University College London (UK) Dr. Heide Hackmann, International Science Council Professor Tolu Oni, Global Young Academy Professor Bruce Alberts, University of California, San Francisco Professor Luiz Davidovich, Brazilian Academy of Science		
17.00	CONFERENCE CLOSING CEREMONY	

CHAIR SPEAKERS AND GUEST MODERATORS

Prof. Min-Koo Han, President, The Korean Academy of Science and Technology



Prof. Han is currently a Professor Emeritus at Seoul National University, Seoul, Korea. His research field of interest is semiconductor device including TFT (Thin Film Transistor) for display application. He started his professional career as an Assistant Professor in Department of Electrical and Computer Engineering at the State University of New York (1979-1984), and moved to Seoul National University in 1984 where he was later appointed as the Dean of the College of Engineering. He became the Board of Director at SID (Society for Information Display) in 2000, and has served as president of various academic societies such as the Korea Nano Technology Research Society and Korea Institute of Electrical Engineers. He has received various prestige awards such as Korea National Academy Award (Ministry of Education) in 2003, Korea Engineering Award (Ministry of Science & Technology) in 2006, Highest Science and Technology Medal (President of Korea) in 2007, SID Fellow Award in 2009, and Best Scientist and Engineers Award (President of Korea) in 2010. He received the B.S. degree from the department of the Electrical Engineering at the Seoul National University, Korea in 1971. He then received the M.S. degree from the department of Electrical Engineering at the University of Michigan in 1975 and Ph.D. degree from the department of Electrical Engineering at the Johns Hopkins University in 1979.

*Professor Volker ter Meulen, Co-Chair, IAP for Science
President, InterAcademy Partnership*



Volker ter Meulen qualified as MD in 1960 and received a training in virology in the USA. He specialised in paediatrics and in clinical virology. In 1975 he became a full professor and Chairman of the Institute of Virology and Immunobiology at the University of Wuerzburg. He retired in 2002, having twice been elected Dean of the Faculty of Medicine of Wuerzburg University. During his research career, ter Meulen worked on molecular and pathogenic aspects of viral infections in man and animals, in particular on infections of the central nervous system. Ter Meulen has on numerous occasions been invited to give policy advice on research matters to German research organisations and to state and federal ministries of science in Germany. Internationally, ter Meulen has served on a number of committees of organisations and scientific societies in the area of virology and infectious diseases. From 2003-2010, ter Meulen was President of the German Academy of Sciences Leopoldina. From 2007-2010, he was President of the European Academies Science Advisory Council (EASAC). 2013 he was elected co-chair of the InterAcademy Partnership (IAP), since 2017 ter Meulen is President of the IAP.



CHAIR SPEAKERS AND GUEST MODERATORS

*Professor **Depei Liu**, Co-Chair, IAP for Health
President, InterAcademy Partnership*



Prof. Depei Liu is a medical molecular biologist. He graduated from Peking Union Medical College with a Ph.D. degree of biochemistry and molecular biology in 1986. During 1987-1990, he worked as a postdoctoral research fellow at the University of California, San Francisco in the United States. Since 1992, he has been a professor and doctoral supervisor. He served as the president of Chinese Academy of Medical Sciences (CAMS) and Peking Union Medical College (PUMC) during the year of 2001-2011, and vice president of Chinese Academy of Engineering (CAE) during the year of 2002-2010. He was elected the member of Chinese Academy of Engineering (CAE) in 1996, and the member of the U.S. National Academy of Medicine (NAM) and the member of Third World Academy of Sciences (TWAS) in 2008. He has been the director of the State Key Laboratory of Medical Molecular Biology of China since 2004, vice president of the Chinese Medical Association since 2010, the chairman of Division of Medical Biochemistry and Molecular Biology, CSBMB (Chinese Society of Biochemistry and Molecular Biology) since 2011. He is also the member of the eleventh and twelfth session of the Standing Committee of the National People's Congress of China. His research expertise is gene regulation, gene therapy and molecular mechanisms of cardiovascular diseases. He studies the cis-elements, trans-factors, higher-order chromatin conformation and nuclear matrix-associated proteins in regulation of globin gene transcription. He investigates the methods to increase the gene expression of globin in anemic status and methods to increase efficiency of gene repair of mutated globin genes. He investigates the roles of calorie restriction and sirtuin gene family in metabolism and cardiovascular diseases. He has published more than 200 original research articles and invited reviews, which have been cited more than 4000 times.

*Professor **Ryan (Seryeon) Song**, Professor of Law, Kyung Hee University*



Ryan Song is currently an associate professor of law at Kyung Hee University College of Law. His main areas of interest are corporate social responsibility, business and human rights, as well as science and technology policy in the context of global governance. Also, he serves as a board member for Korean Human Rights Foundation, and makes a regular appearance in the media as a commentator and/or a host of current affairs programs. He has had several speaking engagements for UN conferences on development and science policies. His previous professional endeavors include McKinsey & Company, a consultancy, Hong & Chang, a corporate law firm, and KAGRO, a business association. He holds a J.D. from Boston College Law School as well as M.P.P. from Harvard Kennedy School. He was admitted to the California Bar in 1990.

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CHAIR SPEAKERS AND GUEST MODERATORS

Dr. Ed Gerstner, Director of Journal Policy & Strategy, Springer Nature



Ed is the Director of Journal Policy & Strategy for Springer Nature. He is responsible for the development and implementation of policy and strategy across the entire Springer Nature journal portfolio. He is also the chair of Springer Nature's Grand Challenges Steering Group, whose task is to coordinate and enhance the company's support of research and researchers who are seeking solutions to the UN Sustainable Development Goals. He has a PhD in Physics from the University of Sydney and several years' postdoctoral research experience at the universities of Cambridge, Sydney, and Surrey. He has been an editor with Nature Research for over sixteen years, with stints at Nature, Nature Materials, Nature Physics, and Nature Communications. In 2012, he helped found Nature's first mainland China office in Shanghai where he built a team of editors from across the Nature family to live and work in China. During his subsequent 6 years in China, he travelled across Asia to learn everything he could about the research that has been going on there, teaching scientists how to improve the impact of their research through greater openness and transparency, and helping to publish their research in the world's best journals. He's spoken at close to one hundred universities and research institutes around the world, to a sum total of over ten thousand researchers. And he was the closing speaker at the 2017 WE Summit in Beijing, to an online audience of over 9 million.

Prof. Mohamed H.A. Hassan, President, the World Academy of Sciences (TWAS) – for the advancement of science in developing countries



Mohamed H A Hassan is President of the World Academy of Sciences (TWAS), Italy and the Sudanese National Academy of Sciences (SNAS), Sudan; Chairman of the Governing Council of the United Nations Technology Bank for the Least Developed Countries, Turkey and Chairman of the International Advisory Board of the Centre for International Development (ZEF), Germany. He also serves on a number of Boards of international organizations worldwide, including the Board of Directors of Grand Challenges Canada (GCC), the Board of Trustees of Bibliotheca Alexandrina, Egypt; the Council of Science and Technology in Society (STS) Forum, Japan. He was President of the InterAcademy Partnership (IAP); founding Executive Director of the World Academy of Sciences (TWAS); President of the African Academy of Sciences (AAS); founding President of the Network of African Science Academies (NASAC); Chairman of the Council of the United Nations University (UNU); and Chairman of the Honorary Presidential Advisory Council for Science and Technology, Nigeria. After obtaining his DPhil in Mathematics from the University of Oxford he returned to Sudan as Lecturer in the University of Khartoum, and later became Professor and Dean of the School of Mathematical Sciences. He has a long list of publications in Theoretical Plasma Physics and Fusion Energy; Wind Erosion, Dust and Sand Transport in Dry Lands. He also published several articles on STI in the Developing World. He is a member of several merit-based academies of science, including, TWAS, African Academy of Sciences, Islamic World Academy of Sciences, Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Académie Royale des Sciences d'Outre-Mer, Belgium, Pakistan Academy of Sciences, Academy of Sciences of Lebanon; Cuban Academy of Sciences; Academy of Science of South Africa and Pontifical Academy of Sciences.



CHAIR SPEAKERS AND GUEST MODERATORS

Dr. Margaret A. Hamburg, Foreign Secretary, National Academy of Medicine (NAM)



Margaret A. Hamburg, M.D. is the former Commissioner of the U.S. Food and Drug Administration, having stepped down from that role in April 2015 after almost six years of service. Dr. Hamburg earned her B.A. from Harvard College, her M.D. from Harvard Medical School and completed her medical residency at Weill Cornell Medical Center. In 1991, Dr. Hamburg was named Commissioner of the New York City Department of Health. During her six-year tenure there, she implemented rigorous public health initiatives that tackled the city's most pressing crises head-on — including improved services for women and children, an internationally recognized Tuberculosis control program, a needle-exchange program to combat HIV transmission, and the nation's first public health bio-terrorism defense program. In 1997, President Clinton named Dr. Hamburg Assistant Secretary for Planning and Evaluation in the U.S. Department of Health and Human Services. She later became founding Vice President for Biological Programs at the Nuclear Threat Initiative, a foundation dedicated to reducing the threat to public safety from nuclear, chemical, and biological weapons. In March 2009, President Obama nominated Dr. Hamburg for the post of FDA Commissioner. In that role, Dr. Hamburg emphasized the critical need for innovation in meeting medical care and public health needs. As Commissioner, she provided leadership on many groundbreaking activities, including implementation of new authorities to regulate tobacco products, new legislation designed to transform our nation's food safety system to one based on prevention rather than simply responding when outbreaks occur, and modernization of the system for the evaluation and approval of medical products. Dr. Hamburg is a Fellow of the American Association for the Advancement of Science and the American College of Physicians, as well as a member of the Council on Foreign Relations and the Institute of Medicine, National Academy of Sciences, where she serves as Foreign Secretary.

2019 Conference. 9-10 April 2019, Incheon, Korea.
Science and the Sustainable Development Goals: The Role of Academies



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SESSION 1

Putting Science and the SDGs in perspective

How can the global science community meet the challenge of the Sustainable Development Goals?

Professor **Jacqueline McGlade**, University College London

and **Sekenani Space and Resilience Research Centre, Maasai Mara University, Kenya**

BIOGRAPHY



Jacqueline McGlade is Professor in the Institute for Global Prosperity and Engineering at University College London, UK, Professor and Director of the Sekenani Space and Resilience Research Centre, Maasai Mara University, Kenya, and the Gresham Professor of the Environment. Her current research ranges from developing traditional medicines to combat malnutrition, how to improve diets in sub-Saharan Africa in the face of climate change, Natural Prosperity, creating citizen science co-laboratories among farmers and pastoralists, and designing the African Regional Data Cube. Previously she was UN Environment's Chief Scientist, Director of Science and Chief Statistician, leading on environmental indicators, data and assessments for the 2030 Agenda on Sustainable Development. She holds a number of key advisory roles including for the European Bank for Reconstruction and Development, China Council and the European Space Agency. She is recognized as a leading expert in ecosystem dynamics, sustainable development, environmental informatics, early warning systems and citizen science using sensor web enabled monitoring systems and applications for web intelligence and decision-making under high uncertainty. She has published more than 200 research publications and produced award winning films and radio series. In 2017 she gave a TEDx talk on Building Resilience to Climate Change and recently featured as the guest in BBC series The Life Scientific.

ABSTRACT

The 2030 Agenda for Sustainable Development sets out a blueprint to achieve a better and more sustainable future for everyone. The 17 SDGs with 169 associated targets are deeply interconnected with many cross-cutting elements, and address the global challenges we face, related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The High-Level Political Forum, which provides the political leadership and accountability found in 2018 that more people are leading better lives than a decade ago, the under-five mortality rate dropped by nearly 50 percent in the least developed countries yet one third of the world still lacks basic sanitation and that for the first time in more than a decade, there are now more hungry people in the world, with conflict one of the main drivers. Global economic losses attributed to the disasters are rising, land degradation threatens the livelihoods of more than 1 billion people and 90 percent of people in cities breathe polluted air. The SDGs present the global science community with the most critical challenges and transformations of our time. Achieving them will require us to draw upon the entire repertoire of our knowledge including complex science systems, planetary boundaries, interdependencies, dealing with poor or missing data, traditional knowledge systems, transformative but potentially disruptive technologies, and social inclusion. It will mean working in different ways, co-creating knowledge with communities of practice and collaborating across disciplinary boundaries. The question is: are we ready and can we deliver?



SESSION 1

Putting Science and the SDGs in perspective

Harnessing STI for the SDGs

Dr. E. William Colglazier, Editor-in-Chief, Science & Diplomacy

BIOGRAPHY



Dr. Colglazier is Editor-in-Chief of Science & Diplomacy and Senior Scholar in the Center for Science Diplomacy at the American Association for Advancement of Science.

From 2016 to 2018 he co-chaired the 10-Member Group appointed by the UN Secretary General to advise on STI for the SDGs. He served as Science and Technology Adviser to the Secretary of State from 2011 to 2014. Beginning in 1994, he served for seventeen year as Executive Officer of the National Academy of Sciences overseeing studies providing independent, objective scientific advice on public policy issues. His PhD is in physics from Caltech.

ABSTRACT

Not only are the 17 SDGs of the 2030 Agenda a great gift helping humanity to aim at a desired future, the UN has asked for the assistance of the world's scientific community in harnessing science, technology, and innovation (STI) to accelerate progress. The challenges are significant, but the role for science is clear: advise on challenges, provide indicators for monitoring progress, search for new innovative solutions, advise on policies and actions with feedback on what is working and not working, and help build a robust STI community and science-policy interface in every country and globally.

Three key actions are: (i) engage with decision-makers and stakeholders to produce "STI for SDGs" roadmaps and thereby integrate STI into national and global action plans for all the SDGs, (ii) provide scientific input on the global constraints to ensure a stable and resilient earth system to help all countries deliver their share of global responsibilities, and (iii) advise on the implications of rapidly advancing scientific knowledge and technological innovations that can be disruptive and transformational for societies to maximize new opportunities and deal with emerging threats. The opportunity for science academies will be enhanced if they produce their own roadmaps for how best to assist their societies - their governments and stakeholders – as well as serve the global interest.



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SESSION 1

Putting Science and the SDGs in perspective

The IAP project “Improving scientific input to global policymaking”

Professor **Eva Alisic**, IAP Project Co-Chair, the IAP SDGs project

BIOGRAPHY



Eva Alisic is a psychologist and social scientist. Her research focuses on child and family resilience in the face of traumatic events, such as disaster, loss and violence. Eva is the Associate Director of the Jack Brockhoff Child Health and Wellbeing Program and Associate Professor, Child Trauma & Recovery at the University of Melbourne. She has initiated large-scale research translation programs focused on improving post-trauma support for children. Prof Alisic led the first population-based study into the consequences of fatal domestic violence for children in the Netherlands (see also www.trauma-recovery.net). She is also involved in child-centered disaster risk reduction studies, and has received a number of prizes for her work, including the World Economic Forum Young Scientist award.

One of Prof Alisic’s main interests regards international and interdisciplinary capacity building. She serves on the management committee of the Africa Science Leadership Program, an innovative program to equip African early and mid-career researchers with collective leadership skills, and is the Co-Chair of the IAP Carnegie project on which her presentation is based.

ABSTRACT

Academies provide a wealth of research expertise and insight that can support global policy making in general and achieving the Sustainable Development Goals (SDGs) in particular. The InterAcademy Partnership project “Improving scientific input to global policymaking” homed in on the SDGs, aiming to mobilize academies, build capacity, and increase collaboration with a range of stakeholders, such as the UN Regional Commissions. The 3-year initiative involved a) an exploratory survey among the IAP membership; b) the development of a guide for academies to ‘demystify’ the SDGs; c) the creation of a database of relevant academy reports; and d) extensive engagement with academies and other stakeholders through regional workshops and other outreach activities.

This presentation will give an overview of the project, its findings, its main outcomes and its recommendations for academies and external partners going forward.

SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

Case studies of demanded and pushed “science for policy” actions related to SDGs

Professor **Roberto Williams**, President of the National Academy of Exact, Physical and Natural Sciences, Argentina

BIOGRAPHY



Williams (PhD, 1972, University of La Plata, Argentina) is Researcher of the National Research Council (CONICET) since 1977, in the field of thermosetting

polymers. Co-author of 2 books, 17 book chapters and 233 scientific articles. He gave opening, plenary and keynote lectures in international symposia held in the Americas and Europe. He was Professor at the Department of Chemical Engineering, University of Mar del Plata (1976-2016). He was organizer (1982) and first director (1982-86, 1988-94) of the Institute of Materials Science and Technology (INTEMA). Member of the Directory Board of CONICET (1997-99). He is Fellow of the National Academy of Exact, Physical and Natural Sciences (ANCEFN, Argentina) since 2009, President of the Engineering Section (2012-16) and President of the Academy since 2016. In 2011, he received the Presidential Award (Investigador de la Nación), the maximum distinction given to a scientist in Argentina.

ABSTRACT

A set of 100 priorities related to specific SDGs was formulated by the Argentine Government in 2016 (www.odesargentina.gob.ar). The Ministry of Science, Technology and Innovation (STI) was asked to prepare the 2030-STI National Plan based on these priorities. Our Academy was invited to join the Advisory Board for the preparation of this plan, together with representatives of different institutions and sectors (scientists, national and provincial governments, congress, universities, industry and services, financial sector). The integration and multi-institutional commitment of points of view of these different actors are the most important lessons of this process.

Apart from the involvement in this plan, the Academy carried out other actions related to SDGs. Of high significance was the organization of the Science 20 (S20) meeting in Argentina in 2018, with the participation of Academies of Sciences of the G20 group. A document on science-based recommendations on the sustainable management and preservation of soils was generated by S20 experts and delivered to the Minister of Science, Technology and Innovation and to the G20 summit (“science for policy” pushed by the Academy). A significant lesson was the need to concentrate on priority targets requiring R&D actions.



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SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

Promoting the engagement of government and society with the SDGs:
The experience of the Brazilian Academy of Sciences

*Professor **Luiz Davidovich**, President, Brazilian Academy of Sciences*

BIOGRAPHY



Luiz Davidovich is Professor of Physics at the Federal University of Rio de Janeiro, President of the Brazilian Academy of Sciences, and Secretary-General of TWAS. He

works on quantum optics and quantum information. He is foreign associate of the USA National Academy of Science. He was awarded the Brazilian Grand-Cross of the National Order of Scientific Merit, the Admiral Alvaro Alberto Prize (the most important prize for science in Brazil), and the 2001 Physics Prize of TWAS. He is fellow of the Optical Society of America and of the American Physical Society.

ABSTRACT

This presentation will review initiatives of the Brazilian Academy of Sciences (BAS) towards increasing the awareness on the SDGs by government and society. They include participation in the governmental National Committee on SDGs, supported by a workgroup, established by BAS, involving other scientific organizations in Brazil; the organization, in March 2019, of an international meeting on Science for Reduction of Poverty and Inequality (an initiative of the IAP committee on Science for Poverty Eradication – SPEC – chaired by BAS); the choice of SDGs as the central theme of the 2019 Annual Meeting of BAS; and the start of a new project, named “Dialogues for Brazil”, involving workshops and debates on themes related to the SDGs. A new internet channel, “Brazilian Academy of Sciences Dialogues” is also being set up. BAS has also participated in international meetings on water resources, food security, and health issues.

The fulfillment of the SDGs requires, in addition, evidence-based political action towards government and several sectors of society, in order to inhibit policies that actually contradict the SDGs, like disregard for pollution, climate change and deforestation, economic and educational policies that increase social inequality, and the downplaying of science and innovation as essential ingredients of economic growth.

SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

ASSAf's role in supporting SDGs in South Africa

Professor Himla Soodyall, Executive Officer, Academy of Science of South Africa Council (ASSAf)

BIOGRAPHY



Professor Himla Soodyall was appointed as the Executive Officer of ASSAf since November 2018. Prior to this she was a Principal Medical Scientist at the National Health

Laboratory Service and Professor of Human Genetics at the University of the Witwatersrand in Johannesburg. She is a member of the IAP working group on "Harnessing Science, Engineering, and Medicine to Address Africa's Challenges" and participated at several events hosted by the IAP.

ABSTRACT

ASSAf has been engaging with the relevant stakeholders [Department of Science and Technology (DST), Department of Planning, Monitoring and Evaluation (DPME), & Statistics South Africa (Stats SA)] to gain a better understanding of the strategy adopted by SA towards achieving the goals of the SDGs. In December 2018, ASSAf in partnership with the DST, hosted the 1st Annual Multi-Stakeholder Forum that was widely advertised to ASSAf members, the wider academic community, stakeholders from other government departments, as well as representatives from various public and private entities to discuss the SDGs. The question of coordination was raised repeatedly during these deliberations. This Forum provided the opportunity for stakeholders to come together creating a space to have conversations and create a community around the SDGs. Discussions focussed on introducing stakeholders to the current status with respect to country coordination at the broader level with regard to the STI response to SDGs.

South Africa is preparing for the next Voluntary National Review in June 2019, and the DPME is leading the process of reporting on this activity. ASSAf will continue to engage with the relevant stakeholders and is committed to aligning its activities to raise the profile of SA's contribution towards achieving the goals of the SDGs.



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SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

The National Academy of Sciences of Sri Lanka: Engagement in Sri Lanka's SDG implementation

Professor **Ranjith Mahindapala**, President, National Academy of Sciences of Sri Lanka

BIOGRAPHY



Ranjith Mahindapala had a 22-year research career at the Coconut Research Institute of Sri Lanka culminating with the position of Director. He introduced a results-based research management system, and authored the book *Coconut Cultivation*, that was reprinted 11 times and won the Sri Lanka Association for Advancement of Science's science writing award. In 1987 he was also the recipient of Young Outstanding Scientist award. For three years he was the Executive Director of the Sri Lanka Council for Agricultural Research Policy. During this time he led the formulation of the National Agricultural Research Plan, coordinated its agricultural research system (including forestry and fisheries), and provided guidance to the agricultural research grant system working with all crop research institutes in Sri Lanka. He spent 18 years at the International Union for Conservation of Nature & Natural Resources, working at both its Sri Lanka Office and Asia Regional Office in Bangkok, where he led the design, development, and implementation of projects and programmes in natural resources management and results-based programme management. He has also been a lead trainer on LFA-based project planning in 11 countries across Asia and West Africa, where he carried out project planning and evaluations programs. He is currently President of the National Academy of Sciences of Sri Lanka, and works also as the Executive Director, Community of Evaluators – South Asia (Delhi, India) as well as Independent Evaluator of Natural Resources Management.

ABSTRACT

The Government of Sri Lanka completed the Voluntary National Review (VNR) of the status of implementing the Sustainable Development Goals in June 2018, and the National Academy of Sciences of Sri Lanka (NASSL) was invited by the Government to review it. NASSL provided assistance, but due to inadequate funding it was unable to undertake more concrete follow-up action, most notably for its proposed interagency forum aimed at bringing together national scientific organisations to help achieve the SDGs. The National Academy of Sciences of Sri Lanka also discussed the Sri Lanka Voluntary Peoples Review (VPR) on the Status of Implementing Sustainable Development Goals, coordinated by the Sri Lanka Stakeholder SDG Platform's Platform Facility. VPR noted that the Government introduced its "Science Indicators for Policy Development" with the objective of providing information on science, technology, and education to policymakers. It also noted that the Government had fallen behind in linking science and technology, and in building a knowledge society through improved scientific literacy while supporting national implementation of SDGs. The Sustainable Development Council (SDC), established in terms of the provisions in the Sustainable Development Act No. 19 of 2017, is now following-up VNR. For this purpose, several working groups are being formed, and NASSL will provide them with its expertise. NASSL acts proactively, communicating regularly with SDC and offering its services.

SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

Proposals for multidisciplinary research for health and disaster response in a Changing Climate

Professor Hye-Yeong Chun, Yonsei University

BIOGRAPHY



Since 1996 Hye-Yeong Chun has been a professor at the Department of Atmospheric Sciences of Yonsei University, Seoul, Korea. She is a well-known expert in atmospheric gravity waves, and pioneered the development of a convective gravity wave parameterization for use in climate models. Her scientific research has been published in major journals, and she has worked at several executive positions at Yonsei University and as the leader of research programs. Hye-Yeong Chun is fellow of the Korean Academy of Science and Technology (KAST) since 2010, and is an elected president of Korean Meteorological Society.

ABSTRACT

The Korean Academy of Science and Technology (KAST) has been supporting the Korean government by offering its long-term vision in the field of Science and Technology, providing independent consultation and recommendation on governmental policies. This is provided through the KAST roundtable discussions, and reports such as the “policy study reports” and “voice of the KAST”.

In this presentation, we will present “Proposal for Multidisciplinary Research for Health and Disaster Response in a Changing Climate”, a recent policy study report by the Yonsei University Division of KAST. This report provides not only an overview on the current status of science and technology related to the prediction of severe weather events associated with climate change, but also suggestions on how this information – including scientific uncertainties – can be used for disaster prevention and health programmes, especially in highly urbanized areas such as Seoul. These problems are strongly related to the SDGs 3, 11, and 13. The report suggests the development of a research center aimed at solving some of the unknown scientific problems and delivering scientific information to decision makers.



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SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

EASAC and the Sustainable Development Goals

Professor **Thierry J.-L. Courvoisier**, President, European Academies Science Advisory Council (EASAC)

BIOGRAPHY



Thierry J.-L. Courvoisier is an astrophysicist. He was born in 1953 in Geneva, Switzerland. He studied theoretical physics at the Swiss Federal Institute of Technology (ETHZ) and obtained a PhD, also in theoretical physics, at the University of Zurich in 1980. He was a scientist in ESA's X-ray astronomy project EXOSAT at the European Space Operations centre in Darmstadt, and worked on HST at the Space Telescope European Coordinating Facility at the European Southern Observatory, in Garching. He joined the University of Geneva in 1988 where he became professor in 1992 and full professor in 1999. He is now honorary professor. He developed high energy astrophysics at the university of Geneva and created and led the INTEGRAL Science Data Centre that is in charge of processing, archiving, analysing and distributing worldwide the data from ESA's gamma ray astronomy satellite INTEGRAL. His research has been dealing mainly with the physics of active galactic nuclei. Thierry Courvoisier was president of the European Astronomical Society from 2010 to 2017. Thierry Courvoisier became president of the Swiss Academy of Natural Sciences in January 2012 and president of the Swiss Academies of Arts and Sciences in January 2013. He exercised both mandates until the end of 2015. He is now president of the European Academies Science Advisory Council (EASAC) for the period 2017-2019. He is the author or co-author of more than 400 scientific papers, of which more than 160 are in the refereed literature, and three books. His papers received more than 6000 citations.

ABSTRACT

The Sustainable Development Goals, SDGs, are not an end for itself, they are a tool, among others, towards making our planet hospitable for humanity, and hence also for other forms of life, for a long period of time. EASAC and its member academies are all committed towards this goal in many ways: When selecting topics for their work, by linking their ongoing work to specific SDGs, when communicating, sometime when looking at their way of operating. Looking at the list of EASAC's reports illustrates all these points. EASAC and the member academies did share their experience on work towards a sustainable future and the SDGs during an IAP-sponsored meeting and will continue to do so. It is important to keep in mind, though, that the science community, and hence academies, must keep a very open door to free research and subjects that may not be directly related to the SDGs. Solutions don't always come from where they are expected.



SESSION 2

The role of Academies in supporting the SDGs: What can we learn from each other?

Engaging with the SDGs: a Global Young Academy perspective

Professor **Yoko Shimpuku**, Associate Professor, Kyoto University, Japan

BIOGRAPHY



Professor Shimpuku is an associate professor in the Graduate School of Medicine, Kyoto University, Japan. She is the Executive Committee of the Global Young Academy and is

in charge of collaboration with National Young Academies. She is also the vice-chair of the Young Academy of Japan. Furthermore, in 2017 she was one of the 20 young scientists invited to the World Science Forum in Jordan, and she was an organizing member of the INGSA pre-conference workshop on science advice that took place in Tokyo in 2018. She was also chosen as an attendee for the 2019 G Science meeting in Paris to provide suggestions on science and technology for the G7 Summit.

ABSTRACT

The Global Young Academy has been dedicating to SDGs in two ways. The first is through its members, e.g., our Working Groups are aligned with the SDGs 3 (Global Health), 4 (Science Education and Outreach/Global State of Young Scientists: GloSYS), 5 (Women in Science/GloSYS), 10 (Global Migration and Human Rights/GloSYS), 15 (DIY Biology), 16 (At-Risk Scholars), and 17 (Science Advice). The details are on our website <https://globallyoungacademy.net/sdgs/>. The second is through our role as facilitator for the global National Young Academy (NYA) network, especially in the ways that we help to bring them together. Our members and NYA nominees participated in the IAP regional SDG meetings in 2018; and we also coordinated the joint statement on the role of young academies in the UN SDGs in 2017 as the outcome of Worldwide Meeting for Young Academies in 2017, which was held in Johannesburg with 60 representatives from 35 Young Academies. In the statement, we described our belief that Young Academies around the world can contribute successfully to national, regional and global SDGs processes using science, research and innovation. To leverage science to attain evidence-based policymaking and to deliver tangible outcomes on the livelihood of societies, we must work together in partnership.



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SESSION 3

Opportunities for engagement in the UN system

The collaboration of the Korean academies with UNFCCC to support the implementation of SDG5 and SDG13

Dr. **Changmo Sung**, Visiting Professor, Korea University

BIOGRAPHY



Dr. Changmo Sung is currently a visiting Professor working on the strategic planning and policy innovation of global energy and environment at Green Graduate School, Korea University. He is currently an Endowed Chair Professor at Korea Institute of Research Development (KIRD) under Ministry of Science & Technology ICT and has been a fellow of the KAST since 2004. He had been Expert Member (representing Asia-Pacific region) at Technology Executive Committee, UNFCCC for 2 years and a president of GTCK (Green Technology Center Korea) for 4 years, an established government institution to coordinate green & climate technology policies of Korea.

ABSTRACT

Climate change is one of the most pressing international issues and tackling this immense problem requires innovation in climate technologies toward low carbon economies. The Technology Mechanism (TM) was established under the UNFCCC to support climate change actions (SDG13) and helped countries develop and transfer technologies so that they were able to effectively reduce GHGs. TM consists of two complementary bodies that work together to achieve its objective: TEC and CTCN. The TEC strengthens collaboration and cooperation on climate technology action and the CTCN promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries. It provides technology solutions, capacity building, and advice on policy, legal and regulatory frameworks. The Korean academies have been collaborating with TEC and CTCN since 2014 and played a significant role in the implementation of the SDG13 and SDG5. Gender equality and the empowerment of all women and girls is a universal policy goal. It is a key pillar of inclusive growth initiatives and of the SDG5. In this presentation, impacts of Technology Mechanism and role of academies on the diffusion of climate technologies and gender-responsive implementation are discussed.



SESSION 3

Opportunities for engagement in the UN system

Working with UN Regional Commissions

Dr. Katinka Margit Weinberger, Chief of the Environment and Development Policy Section, UN Economic and Social Commission for Asia and the Pacific (UNESCAP)

BIOGRAPHY



Dr. Katinka Weinberger is the Chief of Environment and Development Policy Section (EDPS) at UNESCAP. As Chief of EDPS, she provides leadership in formulating

and coordinating ESCAP's response to the 2030 Agenda. Her previous work experiences include Head of Centre for Alleviation of Poverty for Sustainable Agriculture (CAPSA) between 2010 and 2015, and scientist positions with CIFOR, AVRDC and the Centre for Development Research. A socio-economist by training, her professional interests include sustainable development, rural development, sustainable food systems, evaluation and impact assessment. Today she has twenty years' experience in research for development, planning, supervision and monitoring of research strategies and change management. She has experience in empirical field research in collaboration with national and international partners with diverse professional and cultural backgrounds, and is author of more than 70 publications.

ABSTRACT

The intervention will focus on "Working with UN Regional Commissions", taking the example of the UN Economic and Social Commission for Asia and the Pacific (UNESCAP). It will present the role of UN ESCAP and how academia can engage in 1. The regional follow-up and review of the Sustainable Development Goals in Asia and the Pacific, 2. Providing technical assistance and capacity building support to its member States for the implementation of the 2030 Agenda for sustainable development, and 3. Sharing best practices at the regional level. Lastly, practical examples will be shared, highlighting both success stories and challenges, and lessons learnt on how to engage successfully with academia.



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SESSION 3

Opportunities for engagement in the UN system

Pathways to policy: Science in and for the UN

Dr. Heide Hackmann, CEO, International Science Council (ISC)

BIOGRAPHY



Dr. Heide Hackmann is the Chief Executive Officer of the International Science Council (ISC). She was the Executive Director of the two organisations that merged, in July 2018, to form the ISC: the International Council for Science, from 2015 to July 2018, and of the International Social Science Council for eight years before that. Heide holds a M.Phil in contemporary social theory from the University of Cambridge, UK, and a PhD in science and technology studies from the University of Twente in the Netherlands. She holds membership of several international advisory committees and boards, including the Scientific Advisory Board of the Potsdam Institute for Climate Impact Research (Germany), the Board of the Stockholm Resilience Centre (Sweden), the Mercator Research Institute on Global Commons and Climate Change (Germany), and the Excellence, Impact and Engagement Committee of the Oceans Frontier Institute in Canada. She is a member of the UN's 10-member group supporting the Technology Facilitation Mechanism (TFM) on the Sustainable Development Goals.

ABSTRACT

More than ever, society needs to be able to rely on the solutions that science can and does contribute to major contemporary global problems. At a time when society is perhaps less likely than ever to listen to science, it is vitally important to ensure that science is effectively integrated in key policy making and implementation plans at all levels of governance.

Given its vision of science as a global public good and its mission to be the global voice for science, the International Science Council (ISC) works to secure a strengthened mandate for science in global policy, with a particular focus on amplifying the impact of science in the UN's post-2015 processes, including the 2030 Agenda for Sustainable Development, the Paris Agreement on Climate Change, the Sendai Framework for Disaster Risk Reduction and the New Urban Agenda. In this regard the Council operates across a number of pathways to policy, of which coordination of the UN Major Group for the International Scientific and Technological Community is one.

The presentation will provide an overview of the ISC's work at the science-policy interface within the UN system, highlighting the challenges and opportunities for science – and for national academies of science – to provide scientific input, advice and influence within the UN system.

SESSION 4

How can academies better respond to these opportunities?

How can academies continue to be relevant in a fast-changing world?

Professor **Rajae El Aouad**, Faculty of Medicine and Pharmacy of Rabat

BIOGRAPHY



Rajae El Aouad holds a Doctorate of Medical Studies, a Master of Sciences and a Master of Health Policy and Management. She devoted the first part of her career to setting up several national and WHO reference laboratories at the National Public Health Institute (NPHI) and strengthening Public Health Laboratory Services in Morocco. As Director of the NPHI, she succeeded to strengthen the institution to build research capacity building that was translated into action, public policies and practices. As a Resident Member of the Hassan II Academy of Sciences and Technology (HIIAST), she is a strong advocate of science advice to policy and the use of operational research and evidence based planning to support disease control programs implementation. Rajae has served on several international scientific and advisory committees. She was named to the Women in Science Hall of Fame by the U.S. Department of State in 2012.

ABSTRACT

Self-improvement of the academies has been the cornerstone of the IAP project “Improving scientific input to global policymaking”, so that they are better able to play their part in applying science to society – and, specifically, support the implementation of the SDGs. An IAP survey of national science academies in 2017 revealed that, whilst they acknowledged they had an important role to play in supporting the SDGs, many felt insufficiently prepared to do so. Both senior and young academies indicated that they did not know clearly how to engage in complex and apparently disconnected policy processes in their countries; some indicated they felt invisible or underutilized by their government. Added to this, the world is changing with the rise of new modes of ideas exchange; a demand for more inclusive, democratic decision-making; and a growing skepticism of knowledge and expertise.

These factors gave rise to the preparation of a paper on the role of the academies in the 21st century, prepared by the project’s international working group, which has been shared with all IAP member academies. This paper will form the basis of the presentation. The IAP Triennial Conference provides a timely opportunity to reflect on the challenges academies face and how they may need to evolve to better meet them. This will include how they work together, with others, across disciplines, and in a more service-oriented way.



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SESSION 4

How can academies better respond to these opportunities?

The philosophy and practice of the young academies

Dr. Tolu Oni, Public Health Physician Scientist, Urban Epidemiologist, Clinical Senior Research fellow, University of Cambridge MRC Epidemiology Unit's Global Public Health Research programme.

BIOGRAPHY



Tolu Oni is a Public Health Physician Scientist and urban epidemiologist, and a Clinical Senior Research fellow with the University of Cambridge MRC Epidemiology

Unit's Global Public Health Research programme. She completed her medical training at University College London, postgraduate medical training in the UK and Australia, a Masters in Public Health (Epidemiology) at the University of Cape Town, and her research doctorate in Clinical Epidemiology at Imperial College London. She spent 11 years conducting research in South Africa, where she also completed her public health medical specialty training. There, she established a Research Initiative for Cities Health and Equity, conducting transdisciplinary urban health research. Research activities include systems for health projects: investigating how urban systems can be harnessed for health; and health systems projects: integrated health systems responses to changing patterns of disease and multimorbidity in the context of urbanisation. She serves on several advisory boards including Future Earth and the African Academy of Science Open Research Platform; and is an editorial board member of Lancet Planetary Health, Cities and Health, and the Journal of Urban Health. She is a Fellow of the African Academy of Sciences, a 2015 Next Einstein Forum Fellow, Fellow of the Stellenbosch Institute for Advanced Study, and currently co-chair of the Global Young Academy.

ABSTRACT

A (National) Young Academy (NYA/YA) is an academic organisation typically formed by young scientists and scholars at the beginning of their independent careers who have been selected for the excellence of their research impact and commitment to service. Membership in a NYA/YA is for a limited term, normally 4-5 years, after which members become academy alumni. Young Academies typically work as the voice of young scientists for the advancement of issues important to young scientists. This includes, for example, science education or the dialog between science and society. Most Young Academies are affiliated with a senior Academy of Sciences (or – as in the case of the GYA – with a network of senior academies, the InterAcademy Partnership). One of the strategic aims of the GYA is to act as a facilitator of the growing global network of young academies and to support their establishment as well as joint projects and meetings between them.

The GYA is proud to have helped to boost the establishment of NYAs around the world. Since its inception, 33 NYAs have been established, many of them with support from the GYA and its members. Overall, 38 NYAs and more than 10 similar bodies now exist worldwide. More are close to launching in 2019.



SESSION 4

How can academies better respond to these opportunities?

IAP's strategic plan: an inter-academy road map to 2030?

Dr. **Teresa Stoepler**, Executive Director, IAP for Research

Dr. **Peter McGrath**, Coordinator, IAP for Science

BIOGRAPHY



Teresa Stoepler is Executive Director of the InterAcademy Partnership for Research and a senior program officer at the U.S. National Academy of Sciences (NAS). Teresa

also leads the Pakistan-U.S. Science & Technology Cooperation Program and contributes to other NAS science diplomacy programmes. As a member of the Global Young Academy, she co-chairs the At-Risk Scholar Initiative to support displaced and refugee early-career scholars. Trained as a plant-insect ecologist, Teresa holds a Ph.D. in Biological Sciences from The George Washington University.



Following a career in research and experience in science communication, Peter McGrath joined The World Academy of Sciences (TWAS) in 2003, initially in its

Public Information Office, and later managing TWAS's various capacity building programmes. He was appointed Coordinator of IAP for Science and IAP for Health in 2013.

ABSTRACT

The previous IAP strategic planning period (2016-2019) saw new projects, new partnerships and novel ways for academies to work together. Lessons learned and fresh insights from these activities have helped to shape IAP's next strategic plan (2019-2022), which will be open for discussion and presented for approval by IAP members during the 2019 General Assembly. In the same period, the landscape of global science has evolved with new and reconfigured players providing scientific thinking and advice on increasingly complex and urgent issues, many of them encapsulated in the SDGs. IAP must work to its unique strengths to help identify evidence-based solutions to these issues. The IAP Secretariat heads will set out IAP's unique strengths, drawing on learning from (1) recent innovative projects (notably the FNSA interregional and Carnegie projects); (2) closer relations with the global policymaking community (including parts of the UN system) and global assessment programmes (for example, its observer status to the Intergovernmental Panel on Climate Change, IPCC); (3) more active participation in global science fora (such as the World Science Forum and World Health Summit); and (4) the continued streamlining of its structure into a more integrated partnership, underpinned by active regional networks with the aim of further engaging IAP's academy members. The Secretariat heads will then provide highlights of the draft strategic plan (2019-2022), and identify where supporting the SDGs can help IAP and its members meet the proposed objectives.



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SESSION 5

Thematic case study 1:

IAP Food & Nutrition Security & Agriculture (FNSA)

Food and Nutrition Security and Agriculture report

Dr. **Robin Fears**, Biosciences Programme Director, European Academies Science Advisory Council (EASAC)

BIOGRAPHY



29 years experience in the pharmaceutical industry in the UK in R&D. The first 20 years were focused on cardiovascular disease and neurosciences, from discovery through to marketed product. The final 9 years of this industry experience was occupied in setting up and leading a policy group for R&D in Europe. While in industry, he served on committees advising UK and EU trade associations, UK government, Research Councils, university groups and the European Commission and he was Honorary Senior Fellow at the School of Public Policy, University College London. Since leaving the UK pharmaceutical sector, he has worked as advisor to various bodies including academies, universities, businesses and parliamentary groups on issues relating to biomedical science and innovation within the European policy environment. He has provided biosciences support to EASAC since 2002.

ABSTRACT

EASAC's contribution to the IAP project has emphasized that Europe is not immune from food and nutrition security (FNS) challenges. There are problems of undernutrition in vulnerable groups, overconsumption widely, and often a lack of country-level data to quantify and monitor the challenges. The issues are relevant to multiple SDGs and their interactions, particularly SDG 2-3, SDG 2-13 and SDG 3-13 (but also 2-15, 2-14 and 2-7). The IAP project and its regional work streams can, itself, be seen as an international partnership example of SDG 17. Recent analysis of European progress on individual SDGs shows significant achievements for SDG 3 but much less for SDG 2. There is critical need to bridge SDG 2 and 13 to respond to climate change in ways that do not threaten FNS: the objective is sustainable, healthy diets. Responding to climate change must include adaptation for climate-smart agriculture, for example biosciences research to support new plant breeding techniques, and social sciences research to understand and inform farmer behaviour. It also entails mitigating agriculture's contribution to climate change in a way that can bring co-benefits for health. Moreover, Europe must achieve these goals, and other priorities for FNSA, in ways that do not export problems of sustainability to the rest of the world.

SESSION 5

Thematic case study 1: IAP Food & Nutrition Security & Agriculture (FNSEA)

Network of African Science Academies (NASAC)

Professor **Sheryl L Hendriks**, Director, Institute for Food, Nutrition and Well-being, University of Pretoria, South Africa.

BIOGRAPHY



Professor Sheryl L Hendriks is a Professor and Head of Department of Agricultural Economics, Extension and Rural Development and Director of the Institute for Food, Nutrition and Well-being at the University of Pretoria, South Africa. She is a food security expert with extensive experience in policy analysis and programme design as well as food security monitoring and evaluation systems. She is engaged in high-level global food security policy think tanks and panels, is influential in food security and nutrition policy circles in Africa and actively supports food policy reform in African countries.

ABSTRACT

Opportunities and Challenges for Research on Food and Nutrition Security and Agriculture in Africa takes an integrated approach to understanding the complexities and inter-relationships of agriculture and food systems in the African context and the influence these have on rural livelihoods and the diets of households and vulnerable individuals. This presentation will focus on the opportunities that Science, Technology and Innovation (STI) offer to overcome these challenges and to transform African food systems to achieve the “Africa we want” as set out in the vision of Agenda 2063 and the relevant SDGs (1, 2, 3, 5, 6, 7, 12, 13, 15 and 17 in particular). Achieving the African agenda within the framework of the SDGs will require strong political commitment informed by scientific evidence and the human capacity to support agriculture and food system transformation. The report provides examples of how STI solutions can support this agenda through presenting solutions for improving agriculture and food system efficiency, farm system resilience, food safety and waste reduction. The examples demonstrate how a food system approach can provide a framework for inter-sectoral solutions to addressing the complexity of food security and nutrition in the African context.



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SESSION 5

Thematic case study 1: IAP Food & Nutrition Security & Agriculture (FNSEA)

Food and Nutrition Security and Agriculture: Perspectives from Asia

Professor **Paul J. Moughan**, Distinguished Professor, Massey University

BIOGRAPHY



Professor Paul J Moughan holds the position of Distinguished Professor, Massey University, New Zealand and Riddet Institute Fellow Laureate.

He has published in excess of 400 scientific works. In 1995 he was awarded Doctor of Science and in 1997 was awarded a Personal Chair at Massey University and was elected a Fellow of the Royal Society of New Zealand. He is a Fellow of the Royal Society of Chemistry, Cambridge, England. In 2014 he was awarded an Honorary Doctor of Science from the University of Guelph, Canada and in 2018 he was awarded the Wageningen University Medal of Honour.

ABSTRACT

The world's population is growing rapidly such that by 2050 it is estimated that the world will need to produce 70% more food than it does today. Much of the growth in population numbers will occur in developing nations and it is also expected that with accompanying economic growth in these countries there will be a burgeoning middle class. As the middle class expands there is an increased relative demand for high protein foods such as eggs, fish, meat and dairy. This trend augments other trends that point to an escalating future demand for food proteins. Already, however, close to 800 million humans suffer from protein/energy malnutrition, so the challenge to adequately feed the world's population will be formidable. It appears that there is sufficient cultivable land available to meet the increased demand, but agricultural productivity will need to increase and food wastage will need to decline. Education, research and extension in the agricultural, environmental and food sciences will be vital and centre-stage. The ability to use all food nutrients, but especially protein, wisely will become critical. Global Food Security will be discussed in the context of future population growth in Asia and the Pacific.



SESSION 5

Thematic case study 1: IAP Food & Nutrition Security & Agriculture (FNSEA)

Food security prospective and strategic plan for Korea

Professor Hyun Jin Park, Dept. of Biotechnology, School of Life Sciences & Biotechnology, Korea University

BIOGRAPHY



Dr. Hyun Jin Park is a professor at Korea University's Biotechnology Department and has been director of its Functional Food Research Center since 1997. His work

focuses on nanoscale science in food and food packaging, encompassing processing, application and regulation. He has been a Fellow of Korean Academy of Science and Technology (KAST) since 2014, and was elected as a Fellow of the Institute of Food Technologists (IFT) in 2015 and of the International Academy of Food Science and Technology (IAFoST) in 2016.

ABSTRACT

This presentation consists of 3 parts: 1. Forecasting future food supply and demand in the Korean peninsula, 2. Potential food production capacity of Korea, and 3. Suggestions to achieve food security in Korea. When preparing for the unification of South and North Korea, forecasting future food supply and demand is essential to secure food for the 80 million people who inhabit the Korean Peninsula. Although South Korea's economy has reached the level of advanced countries, it is still mostly dependent on imported food. In addition, North Korea has been suffering from severe famine. Therefore, food security in the Korean Peninsula is an important issue. This presentation analyses the current food situation in South and North Korea, discusses this issue and presents potential improvement strategies taking into account both dietetics and anthropology. We estimated potential food production capacity of North Korea and forecasted grains supply and demand in the Korean Peninsula assuming unification happens in a near future. We also compared the food industry of South Korea with that of North Korea, and forecasted the outlook for food supply and demand after the unification. It could be a blessing that there is really a chance for unification of the two Koreas. To achieve it, we should control the selfishness, keep social justice alive, and build a good society based on equality, without any repression. We should respect each other, and make a society where residents of North Korea want to live together with those of South Korea. This is something deeper than the economic gains that a future unification could bring: is the way in which Korea could become a true developed country.



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SESSION 5

Thematic case study 1: IAP Food & Nutrition Security & Agriculture (FNSEA)

Food and Nutrition Security and Agriculture: The IANAS report

Professor **Jeremy McNeil**, Co-Chair, IANAS

BIOGRAPHY



Jeremy N. McNeil was born in Tonbridge, England, received his B. Sc. in Canada (1969) and his PhD in the USA (1972). From 1972-2012 he was a professor at Laval University and in 2013 was a Humboldt Fellow in Hamburg. Professor McNeil is now the H. Battle Professor of Chemical Ecology at the University of Western Ontario. He has an interdisciplinary research programme in chemical ecology and has published more than 200 scientific papers. He has received a number of national and international awards for his research including the Gold Medal from the Entomological Society of Canada, the Fry Medal of the Canadian Society of Zoologist, the Silver Medal of the International Society of Chemical Ecology and the Delwart Prize in Chemical Ecology. He is a Fellow of the Royal Society of Canada and is the RSC Foreign Secretary. For over 30 years he has been engaged, both at home and abroad, in activities relating to the public awareness of science. In 2014 he was appointed to the Order of Canada for his research and for his dedication to increasing public appreciation of science.

ABSTRACT

IANAS took a somewhat different approach than the other three regional networks due to the obvious intercountry differences when considering factors such as economics, climatic conditions and crop diversity. We prepared a general framework which each country used to prepare a book chapter that assessed their nations situation. This required the mobilization of 232 scientists from different countries to work towards a common goal, but it was our believe that nation- specific documents would be the most useful documents for Academies when interacting with their national policy makers. It became clear from the country reports that (i) together the Americas have a great potential to contribute to the future global needs with respect to food production and (ii) that within the Americas the Caribbean is the region that will be the most negatively affected with respect to food security and sustainable agriculture. Clearly, these both relate to SDG 17 “Partnerships for the Goals” as suitable outcomes will only be result from concerted international efforts. In addition to the country chapters, there were special features, that addressed issues relevant to specific SDGs. For example, there is a chapter “Factors relating to gender and food security/insecurity” that directly relevant to SDG 5 on Gender Equity.



SESSION 6

Thematic case study 2: Artificial Intelligence (AI)

Cognitive AI and Incremental Machine Learning

Professor **O.K. Baek**, Research Fellow & Head, Federal Research Agency of Korea, ETRI

BIOGRAPHY



O.K. Baek is Research Fellow & Head of Cognitive Informatics Research Division at the Federal Research Agency of Korea. He is currently leading the strategic institutional

initiative for development of a next generation AI (“CybreBrain”), addressing constraints and shortcomings inherent in today’s AI and machine learning technologies. He has over 40 years of extensive experience and in-depth expertise in research & development of advanced systems and complex industry solutions. He has developed and taught various courses in modeling, architecture, end-to-end solution design, and R&D methodologies.

ABSTRACT

In this opening presentation, the presenter will discuss the capabilities and shortcomings of today’s AI technologies, i.e., what today’s AI is and is not and what it can do and cannot do. AI is out of the research laboratories and into our living room. It is changing the way companies do business, governments provide public services, and even the socioeconomic behaviors of ordinary people. Businesses in all sectors are jumping onto the “AI wagon” to improve operational efficiency and to gain competitive advantages. Meanwhile, there are headlines predicting mass unemployment and portraying AI as a potential threat to human civilization. With the arrival of the Information Age and its knowledge-based economy, human civilization is going through another technological revolution called the “Fourth Industrial Revolution”, which is aiming at augmenting our mental capability. Applications of today’s AI technology will be reviewed to assess the constraints inherent in today’s AI technologies as well as its capabilities and potential to accelerate the realization of the SDGs. As a case study, the presenter will also discuss the opportunities to exploit AI for enabling preventative healthcare and precision medicine and for mitigating health risks associated with air pollution caused by fine particulate matters.



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SESSION 6

Thematic case study 2: Artificial Intelligence (AI)

Smart Cities: Digital solutions for a more livable future

Jeongmin Seong, Senior Fellow, McKinsey Global Institute

BIOGRAPHY



Jeongmin Seong is Senior Fellow at the McKinsey Global Institute, McKinsey & Company's business and economics research arm. He leads MGI research teams in China, working on global as well as emerging market-focused themes. Jeongmin's recent research has focused on globalization, technology, innovation and economic development. He has co-authored several MGI reports and discussion papers, including Notes from the AI frontier: Modeling the impact of AI on the world economy; Globalization in transition: The future of global trade and value chains; Outperformers: High-growth emerging economies and the companies that propel them; China's digital economy: Powering the economy to global competitiveness; Artificial Intelligence: Implication for China. Prior to joining MGI, Jeongmin worked with companies around the world focusing on consumer facing industries including consumer electronics, retail, and automotive. Jeongmin also led McKinsey's emerging market growth service line. Jeongmin is a graduate of Harvard Business School where he received his MBA degree.

ABSTRACT

After a decade of experimentation, smart cities are entering a new phase. Although they are only one part of the full tool kit for making a city great, AI and digitally enabled solutions are the most powerful and cost-effective additions to that tool kit in many years. Smart cities add digital intelligence to existing urban systems, making it possible to do more with less. Connected applications put real-time, transparent information into the hands of users to help them make better choices. These tools can save lives, prevent crime, and reduce the disease burden. They can save time, reduce waste, and even help boost social connectedness. When cities function more efficiently, they also become more productive places to do business. MGI assessed found that these tools could reduce fatalities by 8–10 percent, accelerate emergency response times by 20–35 percent, shave the average commute by 15–20 percent, lower the disease burden by 8–15 percent, and cut greenhouse gas emissions by 10–15 percent, among other positive outcomes. The technologies analyzed in this report can help cities make moderate or significant progress toward 70 percent of the Sustainable Development Goals. Yet becoming a smart city is less effective as an economic development strategy for job creation. Becoming a smart city is not a goal but a means to an end. Smart cities need to focus on improving outcomes for residents and enlisting their active participation in shaping the places they call home



SESSION 6

Thematic case study 2: Artificial Intelligence (AI)

The promise of AI: Transforming health systems from reactive to predictive, preventative and high performing

Dr. **Ann Aerts**, Head, Novartis Foundation

BIOGRAPHY



Dr. Ann Aerts has been Head of the Novartis Foundation (www.novartisfoundation.org) since 2013, where she leads an organization committed to having a transformational and sustainable impact on the health of low-income populations. Ann holds a Degree in Medicine and a Master in Public Health from the University of Leuven, Belgium, and a Degree in Tropical Medicine from the Institute of Tropical Medicine in Antwerp, Belgium. Author of numerous publications, Ann is also a member of the Broadband Commission for Digital Development, the Governing Council of the UN Technology Bank for Least Developed Countries and the International Advisory Board of the Commonwealth Centre for Digital Health.

ABSTRACT

Data and digital technology are increasing the potential for AI to transform all sectors, including health. AI offers unprecedented opportunities to redesign health systems from being reactive, to being predictive, preventative and better able to deliver coordinated care. It offers potential to overcome health system weaknesses, including shortages of professionals. Although the impact of AI is only beginning, success stories already suggest it can greatly improve healthcare. However, a number of challenges threaten successful initiatives. For example, AI must incorporate into existing systems instead of creating parallel systems, and use person-centered designs and local context. At the same time, significant investment is required to curate available data or integrate unstructured data. Moreover, because most algorithms rely on retrospective data – not validated in real-world settings – some suggest AI is more hype than science. In addition, stakeholders must develop clear rules on data privacy, ethics, security, safety, fairness, transparency and accountability. Moreover, regulatory systems must adapt to deal with the auto-didactic evolutionary nature of AI algorithms. Digitalization has already begun revolutionizing health sectors in low- and middle-income countries. Now, increasing mobile phone penetration, broadband coverage and the digitalization of health information is setting the stage for AI to expand in low-income settings.



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SPECIAL THEME

The World Health Organization (WHO) and science

Dr. Vasee Moorthy, Coordinator, Research, Ethics, Knowledge Uptake, World Health Organization, on behalf of WHO's Chief Scientist, Dr Soumya Swaminathan

BIOGRAPHY



Dr Vasee Moorthy is an infectious diseases physician, T cell immunologist, clinical trialist and product developer. He leads a unit in WHO, reporting to the Chief Scientist, Dr Swaminathan, that includes the following functions: Global Health Ethics, the Global R&D observatory, International Clinical Trials Registration Platform, WHO's R&D Blueprint for action to prevent epidemics, and quality oversight of WHO's evidence-based guidelines that provide recommendations for clinical practice and public health. One ongoing responsibility is WHO's work in developing governance options for human genome editing. In his 10 years at WHO he has been the lead for malaria vaccine R&D, then for all vaccine R&D, prior to taking up his current post. He was instrumental in development of the highly effective Ebola Vaccine and has led WHO's work in clinical trials policy. Prior to joining WHO, he worked linking research with public health in Kwazulu/Natal, South Africa (1996-1998) led some of the first DNA and recombinant virus vaccine trials in Europe and The Gambia, Africa (1999-2003); set up the first malaria challenge trials in Europe (1999) and led global selection of clinical trial sites for PATH, a US-based NGO (2003-2005). He has a first class honours degree in Natural Sciences from the University of Cambridge, UK, a clinical medicine degree from the University of Oxford, and a PhD in molecular T cell immunology of malaria from the Institute of Molecular Medicine in Oxford.

ABSTRACT

WHO is mandated through the UN system to be the directing and coordinating authority on human health. WHO has 194 Member States that mandate it to provide leadership on matters of public health, and to provide technical assistance to countries on health matters. It has engaged in applications of science to health for over 70 years, for example through the research that enabled successful smallpox eradication. WHO's current technical strategy reorients the organization's role in science to be more forward-looking, with its new strategy (2019-2023) calling on WHO to "anticipate and assess the impact of research and discovery on public health". This will help accelerate progress towards SDG-3 (good health and well-being) and the many health-related indicators underpinning the SDGs. To this effect, WHO has established a new division of the Chief Scientist to increase its engagement with science communities around the world. National academies of science and medicine are important potential partners to assist WHO in providing links for discourse between scientific and public health communities. This can include ensuring that the best evidence is used to inform WHO normative work; guidance on research priorities for public health and critical unmet needs for R&D of medical and health products; assisting in scaling of innovations in LMIC in particular; the development of governance frameworks for emerging technologies; and advice on how to prioritize, integrate and regulate digital health solutions for the best public health impact. Academies of science looking to interact more with WHO should contact Dr Swaminathan (swaminathans@who.int).



FINAL DISCUSSION PANEL

Responding to challenges for academies in a changing world

Professor **Volker ter Meulen**, Co-Chair, IAP for Science
President, InterAcademy Partnership



Volker ter Meulen qualified as MD in 1960 and received a training in virology in the USA. He specialised in paediatrics and in clinical virology. In 1975 he became a full professor and Chairman of the Institute of Virology and Immunobiology at the University of Wuerzburg. He retired in 2002, having twice been elected Dean of the Faculty of Medicine of Wuerzburg University. During his research career, ter Meulen worked on molecular and pathogenic aspects of viral infections in man and animals, in particular on infections of the central nervous system. Ter Meulen has on numerous occasions been invited to give policy advice on research matters to German research organisations and to state and federal ministries of science in Germany. Internationally, ter Meulen has served on a number of committees of organisations and scientific societies in the area of virology and infectious diseases. From 2003-2010, ter Meulen was President of the German Academy of Sciences Leopoldina. From 2007-2010, he was President of the European Academies Science Advisory Council (EASAC). 2013 he was elected co-chair of the InterAcademy Partnership (IAP), since 2017 ter Meulen is President of the IAP.

Professor **Jacqueline McGlade**, University College London
and Sekenani Space and Resilience Research Centre, Maasai Mara University, Kenya



Jacqueline McGlade is Professor in the Institute for Global Prosperity and Engineering at University College London, UK, Professor and Director of the Sekenani Space and Resilience Research Centre, Maasai Mara University, Kenya, and the Gresham Professor of the Environment. Her current research ranges from developing traditional medicines to combat malnutrition, how to improve diets in sub-Saharan Africa in the face of climate change, Natural Prosperity, creating citizen science co-laboratories among farmers and pastoralists, and designing the African Regional Data Cube. Previously she was UN Environments' Chief Scientist, Director of Science and Chief Statistician, leading on environmental indicators, data and assessments for the 2030 Agenda on Sustainable Development. She holds a number of key advisory roles including for the European Bank for Reconstruction and Development, China Council and the European Space Agency. She is recognized as a leading expert in ecosystem dynamics, sustainable development, environmental informatics, early warning systems and citizen science using sensor web enabled monitoring systems and applications for web intelligence and decision-making under high uncertainty. She has published more than 200 research publications and produced award winning films and radio series. In 2017 she gave a TEDx talk on Building Resilience to Climate Change and recently featured as the guest in BBC series The Life Scientific.

2019 Conference, 9-10 April 2019, Incheon, Korea.
Science and the Sustainable Development Goals: The Role of Academies



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FINAL DISCUSSION PANEL

Responding to challenges for academies in a changing world

Dr. Heide Hackmann, CEO, International Science Council (ISC)



Dr. Heide Hackmann is the Chief Executive Officer of the International Science Council (ISC). She was the Executive Director of the two organisations that merged, in July 2018, to form the ISC: the International Council for Science, from 2015 to July 2018, and of the International Social Science Council for eight years before that. Heide holds a M.Phil in contemporary social theory from the University of Cambridge, UK, and a PhD in science and technology studies from the University of Twente in the Netherlands. She holds membership of several international advisory committees and boards, including the Scientific Advisory Board of the Potsdam Institute for Climate Impact Research (Germany), the Board of the Stockholm Resilience Centre (Sweden), the Mercator Research Institute on Global Commons and Climate Change (Germany), and the Excellence, Impact and Engagement Committee of the Oceans Frontier Institute in Canada.. She is a member of the UN's 10-member group supporting the Technology Facilitation Mechanism (TFM) on the Sustainable Development Goals.

Dr. Tolu Oni, Public Health Physician Scientist, Urban Epidemiologist, Clinical Senior Research fellow, University of Cambridge MRC Epidemiology Unit's Global Public Health Research programme.



Tolu Oni is a Public Health Physician Scientist and urban epidemiologist, and a Clinical Senior Research fellow with the University of Cambridge MRC Epidemiology Unit's Global Public Health Research programme. She completed her medical training at University College London, postgraduate medical training in the UK and Australia, a Masters in Public Health (Epidemiology) at the University of Cape Town, and her research doctorate in Clinical Epidemiology at Imperial College London. She spent 11 years conducting research in South Africa, where she also completed her public health medical specialty training. There, she established a Research Initiative for Cities Health and Equity, conducting transdisciplinary urban health research. Research activities include systems for health projects: investigating how urban systems can be harnessed for health; and health systems projects: integrated health systems responses to changing patterns of disease and multimorbidity in the context of urbanisation. She serves on several advisory boards including Future Earth and the African Academy of Science Open Research Platform; and is an editorial board member of Lancet Planetary Health, Cities and Health, and the Journal of Urban Health. She is a Fellow of the African Academy of Sciences, a 2015 Next Einstein Forum Fellow, Fellow of the Stellenbosch Institute for Advanced Study, and currently co-chair of the Global Young Academy.



FINAL DISCUSSION PANEL

Responding to challenges for academies in a changing world

*Professor **Bruce Alberts**, Chancellor's Leadership Chair in Biochemistry and Biophysics for Science and Education, University of California, San Francisco*



Dr. Bruce M. Alberts is a United States National Medal of Science awardee (2014). He has served as Editor-in-Chief of *Science* (2008-2013) and as one of President Obama's first three United States Science Envoys (2009-2011). Alberts holds the Chancellor's Leadership Chair in Biochemistry and Biophysics for Science and Education at the University of California, San Francisco, to which he returned after serving two six-year terms as the president of the National Academy of Sciences (NAS). Dr. Alberts is noted as one of the original authors of *The Molecular Biology of the Cell*, a pre-eminent textbook in the field now in its sixth edition. Alberts has earned many honors and awards, including 16 honorary degrees. He currently serves on the advisory boards of more than 20 nonprofit institutions, including the Gordon and Betty Moore Foundation and the Strategic Education Research Partnership (SERP).

*Professor **Luiz Davidovich**, President, Brazilian Academy of Sciences*



Luiz Davidovich is Professor of Physics at the Federal University of Rio de Janeiro, President of the Brazilian Academy of Sciences, and Secretary-General of TWAS. He works on quantum optics and quantum information. He is foreign associate of the USA National Academy of Science. He was awarded the Brazilian Grand-Cross of the National Order of Scientific Merit, the Admiral Alvaro Alberto Prize (the most important prize for science in Brazil), and the 2001 Physics Prize of TWAS. He is fellow of the Optical Society of America and of the American Physical Society.

2019 Conference. 9-10 April 2019, Incheon, Korea.
Science and the Sustainable Development Goals: The Role of Academies



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