European Commission

Science & Policy Making

Towards a new dialogue

29 & 30 September 2016, Brussels

Research and Innovation

EUROPEAN COMMISSION

Directorate-General for Research and Innovation

Unit RTD.01— Scientific Advice Mechanism

E-mail: EC-SAM@ec.europa.eu

RTD-PUBLICATIONS@ec.europa.eu

European Commission
B-1049 Brussels

EUROPEAN COMMISSION

The 2nd International Network for Government Science Advice Conference

Science and Policy Making: towards a new dialogue

Brussels, 29-30 September 2016

This report has been written by the conference rapporteur,
Gary Finnegan

Directorate-General for Research and Innovation
2017 Scientific Advice Mechanism EUR 16175 EN

EUROPE DIRECT is a service to help you find answers to your questions about the European Union.

Freephone number (*)**:**

00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Luxembourg: Publications Office of the European Union, 2017

Print ISBN 978-92-79-63021-7 doi:10.2782/365152 HC-06-16-175-EN-C
PDF ISBN 978-92-79-63020-0 doi:10.2782/977668 HC-06-16-175-EN-N

Table of contents

Foreword

Science advice is more important than ever. It helps us address global challenges such as climate change, migration and public health within a context of complexity, uncertainties and rapid changes. At the same time there are signs of a growing general public distrust in experts, sometimes exacerbated by lack of clarity, openness and transparency.

I am convinced that openness can contribute to scientific quality and help to increase trust through transparency and engagement with the public. This is why 'Open science' is one of my main priorities as European Commissioner for Research, Science and Innovation. Openness means that the results of scientific projects are free to access for everyone. Openness also means that scientific data can be found and are reproducible by other scientists. Openness means in addition clear standards of research integrity, and mechanisms to tackle scientific misconduct.

At the same time, policy challenges requiring scientific advice are becoming more and more global. This calls both for science advice structures at transnational level and for international cooperation in science advice. Science diplomacy, which is part of my policy priority 'Open to the world' can facilitate cooperation in gathering scientific evidence across borders and tackling the grand challenges together.

The European Commission responded to the changing environment of science advice by establishing the Scientific Advice Mechanism (SAM). SAM is an interdisciplinary body set up to provide Commissioners with high quality, timely, independent and transparent scientific advice, through a High Level Group of Scientific Advisors, a partnership with the science academies of Europe, and stronger engagement with wider scientific communities.

The present report summarises the presentations, discussions, and key messages of the conference 'Science and Policy Making: towards a new dialogue'. This second international conference on science advice to governments was jointly organised by the European Commission, through the SAM Secretariat, and the International Network for Government Science Advice (INGSA). It attracted 450 participants from all over the world demonstrating the growing importance of and interest in this subject.

The objectives were to explore the principles and best practices of science advice to governments through the lens of different policy contexts and to identify ways for improving the interface between science advice and policy-making.

It marks a milestone in the process leading to the identification of common principles of governmental science advice worldwide and to an improved dialogue between scientists, policy-makers and the public.

I would like to thank everybody involved in the organisation of this successful conference and the production of this report and wish you an informative read.

Carlos Moedas

European Commissioner for Research, Science and Innovation

Executive Summary

The 2nd International Network for Government Science Advice Conference was held in Brussels on the 29th and 30th of September, 2016. Under the title 'Science and Policy Making: towards a new dialogue', the event attracted about 450 participants, including prominent users and providers of scientific advice on critical global issues.

The event was timely: Science advice has never been in greater demand; nor has it been more contested. To help address this, the International Network for Government Science Advice (INGSA) was established under the umbrella of the International Council for Science (ICSU) in 2014. The World Science Forum (WSF) has asked the network to develop principles and guidelines for effective science advisory systems.

Models of science advice are evolving, particularly at transnational level. The United Nations established a Science Advisory Board to the Secretary-General in 2014 and the European Commission introduced a new Scientific Advice Mechanism (SAM) in 2015. This reflects the increasingly global nature of the challenges humanity faces.

Participants in the conference discussed the positive role evidence can play in policy formation and implementation, and explored the barriers to better dialogue between experts and policy-makers. Science is entering a 'post normal' phase characterised by uncertainty, dispute of values, high stakes and an urgent need for decisions.

The need for greater mutual understanding between science and policy communities – as well as with the wider public – was a recurrent theme. To help bridge the gap, 'knowledge brokers' are needed at the interface between science, policy and society.

Tensions arise when science meets societal values. Speakers emphasised the importance of good communication, transparency and independence in building and maintaining trust. Early engagement with citizens, and a stronger role for social sciences, can foster the co-development of evidence-based policies with a higher degree of social acceptability.

Crises, including earthquakes, epidemics and nuclear accidents, put science-policy relationships to the test. Responding quickly while ensuring accuracy is a challenge for science advisors. Experts suggest that building resilient systems and science advice mechanisms can help prepare for crises. Looking to the longer term, foresight and horizon scanning are important tools for shaping how decision-makers prioritise and develop policies.

Scientists, policy-makers and science advisors must develop the skills needed to collaborate on evidence-based policy-making. Through training, peer support, capacity building and sharing of best practice, producers and users of science advice can raise standards around the world.

The strong interest in this event, and the robust and thoughtful discussions it facilitated, show there is a community of committed experts dedicated to moving this field forward.

Background

'Science advice has never been in greater demand; nor has it been more contested.'[1] The need to bridge the gap between science and policy inspired the establishment of INGSA, under the umbrella of ICSU, which was a result of the first Science Advice to Governments Conference in Auckland, New Zealand, in August 2014. It was co-hosted by the Office of Sir Peter Gluckman, Chief Science Advisor to the Prime Minister of New Zealand, and ICSU. INGSA provides, under the auspices of ICSU, a forum for policy-makers, practitioners, national academies, and academics to share experience, build capacity and develop theoretical and practical approaches to the use of scientific evidence in informing policy at all levels of government.

In 2015 a World Science Forum (WSF) Declaration called for the drawing up of a set of principles and guidelines for effective global science advisory systems. INGSA aims to report back to the WSF in 2017.

In the meantime, models of science advice have been evolving. In December 2015, the European Commission introduced a new Science Advice Mechanism (SAM) to provide evidence-informed advice that is tailored to EU policy-making.

It was against this backdrop that the 2nd International Network for Government Science Advice Conference was held in Brussels on the 29th and 30th of September, 2016. Under the title *'Science and Policy Making: towards a new dialogue',* this over-subscribed event attracted around 450 participants, including prominent users and providers of scientific advice on critical global issues. Policy-makers, science advisors, representatives of academies, industry, civil society, research organisations and higher education institutions from more than 70 countries joined this conference to explore the principles and practice of science advice through the lens of a variety of different policy contexts.

The event was jointly organised by the European Commission and INGSA, and was designed to build on the considerable momentum that has developed since 2014. The programme consisted of eight plenary sessions and 12 topical panels in parallel sessions, all tied together through facilitated discussion and interaction with the audience.

Aims of the 2nd International Network for Government Science Advice Conference

- Identify core principles and best practices common to structures providing scientific advice for governments worldwide.
- Identify practical ways to improve the interaction of the demand and supply side of scientific advice.
- Describe, by means of practical examples, the impact of effective science advisory processes.

(1) James Wilsdon, Professor of Research Policy, Director of Impact & Engagement, University of Sheffield, 2014 Briefing document http://www.global-scienceadvice.org/archive-2014-conference/resources/

Opening session

The Conference was opened by Robert-Jan Smits, Director General of DG Research & Innovation at the European Commission. He set out the challenges facing those who produce and use science advice. The need for scientific input in policy areas such as climate change, migration and public health is greater than ever. However, science itself is increasingly complex and often uncertain, contributing to the fact that the appetite for science advice can sometimes be low. Fostering better dialogue between scientists, policy-makers and the public will be essential to meeting global challenges.

Robert-Jan Smits

"This conference is taking place at a time of historical importance," said Carlos Moedas, European Commissioner for Research, Science and Innovation. "The role of scientific advice has never been more important. And at the same time, scientific advice is becoming more complex and the validity of science is under attack – some call it post-factual politics."

He noted that the job of scientific advisor has been changing dramatically. It is no longer simply about delivering answers. Indeed, with more than half a billion smartphones in the world, the challenge is not to provide facts but to connect the dots between the vast volume of data that is accessible to policy-makers and citizens.

Commissioner Moedas cited vaccines as an example of the disconnect between scientific evidence and public perceptions. Despite the overwhelming body of evidence supporting the safety and efficacy of vaccination, research suggests that public trust in vaccines is low in many countries ([2]). This suggests that the public is not relying on science alone. They

[2] Larson et al. (2016) The state of vaccine confidence 2016: Global insights through a 67-country survey http://www.ebiomedicine.com/article/S2352-3964(16)30398-X/abstract

"It is not enough to provide the evidence. Science advisors need to explain the process"

Commissioner Carlos Moedas

listen to those who can relay information in an understandable, appealing way and whom they deem to be trustworthy.

Science advice must change accordingly. This means being more transparent and open about how evidence is produced and used. "It is not enough to provide the evidence. Science advisors need to explain the process," said Commissioner Moedas. For its part, the Commission is championing open science and has made transparency central to the new Science Advice Mechanism (SAM). In tandem, politicians and policy-makers need to be open about their need for scientific advice.

This was a theme echoed by Tibor Navracsics, European Commissioner for Education, Culture, Youth and Sport, who said the Commission is on the front-line in embracing evidence-informed policy. "The Commission is not a post-fact or post-truth organisation. And I am not a post-fact or post-truth politician," he said.

Commissioner Navracsics reminded participants that the EU had one of the toughest impact assessment processes in the world, including a quality check by independent members of a Regulatory Scrutiny Board. A dedicated science and knowledge service – the Joint Research Centre (JRC) – supports impact assessments with scientific and technical advice. These sources of scientific information are valued by policy-makers faced with complex questions.

Commissioner Tibor Navracsics

Touching on a point that would resurface frequently during the conference, Commissioner Navracsics added that scientists should not expect to determine policy. Instead, their role is to present facts and set out options which can help decision-makers to craft informed policies.

His message to scientists was to put themselves in the shoes of politicians and policy-makers more often: "Try to provide solutions to the societal challenges and policy problems on our desks. There is no shortage!" By tuning in to policy debates, scientists could enhance their capacity for providing relevant and meaningful facts – at the right time and place – in a way that non-scientists will understand. Scientific advisors need to guide policy-makers to make sense of the plethora of available information.

Mairead McGuiness, Vice-President of the European Parliament

The opening session also heard a video message from Mairead McGuinness, Vice-President of the European Parliament responsible for the Science and Technology Options Assessment (STOA) panel. She said parliamentarians deal with issues every day which should be informed by "solid science". "We need to pull back and say that facts matter," she said.

"Knowledge – real knowledge grounded in research – matters in the European Parliament and in parliaments around the world. We count on science to communicate with us."

Ms McGuinness called on scientists to work with policy-makers and she urged politicians to listen carefully to expert input. "I sometimes fear that scientists are anxious about coming forward and that politicians are reluctant to run against the mill," she said. "We need some hard talking from you and you will need the same from us in return."

Age of the evidence broker

The quest for greater mutual understanding between scientists and policy-makers was a recurrent theme throughout the conference. Many speakers emphasised that interaction between science and policy does not occur in a vacuum – it is influenced by context, culture and history, and by the relationship between science and society.

Sir Peter Gluckman, Chair of INGSA and Chief Science Advisor to the Prime Minister of New Zealand, said the interface between science and policy is not a simple two-way dialogue. "There is a three-way interaction between science, policy and society," he said. "There is increasing recognition of the need for 'evidence brokerage' at this interface."

The role of evidence broker requires a distinct set of skills, including a fluency in the language of all three fields. The task for science advisors is to address the issues that science and technology themselves sometimes create for policy-makers and society at a time when the very nature of science is in flux.

"We are moving from normal to post-normal science where we must deal not with certainties but probabilities," said Sir Peter. "If we don't learn to communicate this better we risk making the public and politicians sceptical about the role and utility of science."

"There is increasing recognition of the need for evidence brokerage"

Sir Peter Gluckman

Further complexity is added when science and policy are working to different timeframes. For example, tensions arise when there is urgency around taking a policy decision at a time when the science of a given topic is uncertain. Even when the science is relatively clear, policy decisions can be steeped in societal debate about values which may be in dispute.

Setting the scene for the conference, Sir Peter drew distinctions between the role of science advice in responding to crises and more deliberative foresight exercises. He also called on participants to consider the role of national science advice mechanisms in an international setting, including the role of science in achieving the United Nations Sustainable Development Goals.

"INGSA will promote understanding of the role of evidence brokerage; promote research in this area; build capacity on the supply and demand sides; and serve as a resource that can partner with other parts of the science and policy ecosystems," he said.

Key messages

- Evidence must be an integral part of policy development
- Science is in a 'post normal' phase, characterised by uncertainty, dispute of values, high stakes and an urgent need for decisions
- Just as policy-makers can deepen their understanding of science, scientists need a better understanding of the specific needs of politics and policy-making
- 'Evidence brokers' are needed at the interface between science, policy and society who speak the language of all spheres
- Science advisors need to guide policy-makers in making sense of the plethora of information
- Science advisors must not only provide the evidence, but also explain the process by which it was obtained

Plenary session I

Deepening the dialogue

Changes in the nature of science and policy-making, along with broader economic, societal and environmental pressures, shape the dialogue between scientists and policy-makers. The first plenary session explored the challenges and opportunities that arise in this fast-moving world including those that digital technologies present in bridging the gaps between science, society and the political sphere. Chaired by Ms Danuta Jazłowiecka, Member of the European Parliament and Member of the Science and Technology Options Assessment (STOA) Panel, the session also examined the need for improving science advice in developing countries.

"This is an exciting stage of our understanding of what science advice is and what it should be," said HRH Princess Sumaya bint El Hassan, President of the Royal Scientific Society of Jordan and Chair of the World Science Forum 2017. She noted that INGSA was developing principles and guidelines on science advice which would be shared at the 2017 WSF in Jordan.

"Being the new kid on the block can be an opportunity"

HRH Princess Sumaya bint El Hassan

While much of the conversation around science advice tends to centre on the national level, it is also important to consider local and regional levels as well as the global picture where cultural and linguistic barriers can be significant.

Yet global partnerships are essential. Not only do many of the challenges facing humanity require collective action, science presents an opportunity for knowledge-sharing that supports international development. HRH Princess Sumaya bint El Hassan said developing countries must ensure accountability and credibility of science and science advice in order to build trust.

Developed nations, for their part, should ensure that science advice mechanisms do not exacerbate the divide between rich and poor by focusing primarily on 'big science' at the expense of mechanisms that foster sustainable development at local level. Capacity-building in developing countries should be accelerated by forming strong institutional links and embracing digital tools.

Despite the challenges faced in regions such as the Middle East, Princess El Hassan noted that developing countries have reason for optimism: they can catch-up – or even overtake – advanced nations by swiftly adopting best practices learned from others. "Sometimes being the new kid on the block can be an opportunity," she said.

Nurturing the ecosystem

Several speakers emphasised that science-policy dialogues do not take place in a vacuum: all exchanges are influenced by the environment in which they take place. Dr Flavia Schlegel, Assistant Director-General for the Natural Sciences at UNESCO, said the ecosystem can either be enabling or limiting depending on the role of civil society and business, as well as social attitudes to education. "Science is dependent on the ecosystem, but it can also change the ecosystem," she noted.

Flavia Schlegel

UNESCO, which promotes peace and sustainable development through science, education and culture, serves as secretariat to the UN Secretary General's Scientific Advisory Board. Dr Schlegel said it would be interesting to compare the ways in which science advice is delivered by the Scientific Advisory Board and the European Commission's Scientific Advice Mechanism. UNESCO is also engaging in a citizen

Yuko Harayama

science programme and has a formal cooperation agreement with ICSU and INGSA. Strengthening scientific and science advisory infrastructure can ultimately benefit peace and sustainable development, as demanded by the 2030 Agenda for Sustainable Development.

Other international organisations such as the OECD are also active in the field of evidence-based policy-making. Dr Yuko Harayama, Executive Member of the Council for Science and Technology Policy, Cabinet Office of Japan, said a more scientific approach to policy creation is needed, but that this would require new tools to deal with the data deluge that can submerge policy-makers. "Sometimes there is too much information. We need better analytics tools," she said.

One of the weaknesses identified by Dr Harayama is the tendency for scientists and policy-makers to use different definitions. Even scientists working in separate fields can have difficulty communicating, so an intermediary is required. "We need an honest broker to ensure we are speaking the same language. We have to empower people to become intermediaries," Dr Harayama said.

Food for thought

Bringing civil society into the development of scientific opinions promises to make for more democratic and socially acceptable policies. However, this kind of co-development is not without its difficulties. "It's a real challenge to bring non-scientists into a highly-regulated environment," said Dr Bernhard Url, Executive Director of the European Food Safety Authority (EFSA). EFSA has first-hand experience of the tensions that can arise "when science meets values" in areas such as genetically-modified organisms.

"It is a challenge to bring non-experts into a highly-regulated environment"

Bernhard Url

Food safety is at the coalface of post-normal science where scientists, policy-makers and society struggle to deal with the complexities and uncertainties that characterise the conversation. "Science is no longer seen as a means for enlightenment. In food safety, science is seen as promoting risk under the label of innovation," Dr Url said. "Science is perceived as an elite endeavour contributing to inequality rather than addressing it".

He contended that communication and transparency alone are not enough: the next step is to boost engagement of the public and civil society in the co-development of science advice. EFSA is reaching out to civil society, consulting academics, industry experts and NGOs. This raises the issue of experts' independence. Dr Url asked how independence should be defined. "We need clarity on this – how independent can and must experts be? What is independent enough?" Another question which needs to be addressed in this context is how we can bring scientists and non-scientists into the very strictly regulated environment of delivering science advice for governments.

The push for greater transparency also comes with trade-offs. For risk assessors, accessing as much data as possible is essential to reaching fully informed decisions. However, publishing research results generated privately may compromise intellectual property rights. A legal framework might be needed to handle such issues.

Continuing the theme of science that can spark controversies, Dr Clare Matterson, Strategy Director of the Wellcome Trust, shared a case study on mitochondrial donation. The Wellcome Trust funded the research but also played a role in public engagement on the topic. They trained the principal investigator in communicating with the public, worked with parents and patient groups affected by fatal mitochondrial disease, hosted debates on safety and regulatory issues, and consulted ethicists.

"At a certain point in time we shifted from public consultation and open discussion into very targeted campaign mode," Dr Matterson said. "We worked closely with the media, social media, social commentators, and opinion formers; and we briefed MPs, members of the House of Lords and politicians' advisors."

Clare Matterson

The experience showed the value of engaging early in dialogue and knowing when to switch gear into a more active mode. The question now is how the Wellcome Trust can apply this to other big questions such as antimicrobial resistance and the impact of climate on health.

Discussion

In an open discussion that followed the presentations, participants from the floor addressed a number of the issues raised by speakers. One academic suggested that more emphasis should be given to interactions between scientists and administrations rather than with individual politicians. In the interest of building sustainable structures, relationships with permanent government officials may be more enduring, it was suggested.

The question of expert independence was raised. It was proposed that securing total independence of science advice might be an unattainable ideal. Rather than seeking independence, the focus should be on competence and expertise, the speaker said. Cutting industry experts out of the conversation might deprive policy-makers of valuable input.

Another contributor said the education system is out of date. A more interdisciplinary approach is needed, he said.

Key messages

- Science advice is often provided at a national level, but must take local and global views
- Science influences, and is influenced by, a wider societal and political ecosystem
- Tensions arise where science meets societal values
- In addition to communication and transparency, science advice needs the engagement of civil society to ease tensions

Plenary session II

Solution-oriented scientific advice

Science advice to policy-makers must be solution-oriented. However, the timeframes of science and policy-making are often out of sync. Science should be based on facts; it should be rigorous, methodical, and sceptical and is often fraught with uncertainty. Policy-making must deal with social and time pressures, respect values, public opinion and feasibility constraints, and is often aiming at legislation or regulation which must be clear and definitive. Add to that the specialist language sometimes used in each sphere, and it is plain why communication can be difficult.

This challenge is greatest at times of social change. From urbanisation and migration to digitisation and automation, science advice can play a valuable role in addressing the challenges faced by modern society. To support policy-makers in tackling such complex problems, science advisors must tap into multidisciplinary expertise from the natural and social, including behavioural sciences.

This session, moderated by Rolf-Dieter Heuer, former Director-General of CERN and Member of the European Commission's High-Level Group of Scientific Advisors, sought to explore how science and policy should interact in these times of change. One of the key issues for science advisors is how to maintain trust and legitimacy when technological innovations are themselves the cause of social upheaval.

Jacques Lukasik, Secretary-General of the European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE), said the digital age is catalysing changes in how we live and work. "Science and technology are having an unparalleled impact on our society," he said. "Technological innovation raises questions in society which can lead to public mistrust and fear of science and technology, especially when innovations are seen to benefit one part of society while having a negative impact on others."

"Technological innovation raises questions that can lead to public mistrust"

Jacques Lukasik

He said the communication gap between scientists and the public is a major issue. The inability of scientists to explain big ideas in plain and accessible language is affecting public perceptions of nanotechnology, nuclear energy and vaccination.

Dr Lukasik said the European Commission's Science Advice Mechanism would draw on the expertise of all scientific fields in order to develop comprehensive, multidisciplinary advice. More than 100 scientific academies from across Europe would have input into a more transparent and evidence-based policy-making. SAM would seek to present policy-makers with scenarios and options which would help Europe to respond to the challenges it faces. "Society has much to gain from the proactive involvement of scientists in policy-making in critical periods of social transformation," he concluded.

Earning authority

Pearl Dykstra, Member of the European Commission's High-Level Group of Scientific Advisors, said scientists are under increasing pressure to deliver. "The pressure comes from the public, from funding organisations and from policy-makers," she said. "And that pressure is excellent!" This heightened scrutiny means experts can no long take their authority for granted, she added. "We have to earn our authority."

Discussing the role of science in policy-making, she said scientists can help to define questions for policy-makers. They can play the role of expert witness and of 'mythbusters' – dispelling unwarranted concerns and raising issues that are underappreciated. "We also have a role as storytellers," Dr Dykstra said. "There is so much evidence out there; we need to help people to make sense of it."

"Scientists are under increasing pressure – that pressure is excellent!"

Pearl Dykstra

She said better links could be built between scientists and policy-makers if both groups had the patience and resources to understand one another. There are some examples to help scientists to engage with policy-makers, including the Public Policy Exchange in the UK, which organises regular interactive meetings with scientists, stakeholders and policy-makers for policy discussion, debate and networking.

In praise of humility

Dame Helen Wallace, Member of Academia Europaea and Fellow of the British Academy, said scientists and policy-makers operate in silos, each believing that their way of thinking is superior to the other: "Sometimes academics are very arrogant about policy-makers and vice versa." She said some are a little too comfortable on their own side of the divide and that greater effort was need to reach across the aisle.

Dame Helen Wallace

Dame Helen made the case for hearing the voices of the so-called 'softer sciences' in policy formation. Social sciences should be central to this dialogue rather than being an add-on at the end of a policy development process. Solving policy problems is often about more than the technical question of what can be done; the bigger question is whether something is socially acceptable. "These questions need to be factored in from the outset," she said. Dame Helen also called for the inclusion of entrepreneurs in the science-policy dialogue as they play a key role in translating knowledge into economic and social benefits.

Cultural and social diversity across Europe must be considered when crafting policies at European level. Rather than speaking of 'scientists' and 'policy-makers' as two distinct homogenous groups, it is essential to recognise that people in one part of Europe may approach problems in different ways to those in another Member State.

Big data, big opportunities

Maive Rute, Deputy Director-General of the Joint Research Centre (JRC), European Commission, outlined the role of the JRC in informing policy-making. The JRC, the European Commission's in-house research service, has evolved considerably over the course of six decades. 'Knowledge provision' is now an important part of its role, along with research, training and outreach.

Maive Rute

One area of current interest for the JRC is in helping the Commission deal with the data deluge: the digital era has seen a flood of information which, while sometimes overwhelming, has the potential to unlock new insights. The JRC is putting new structures in place to help make sense of this enormous volume of data. It is also expanding in areas

such as economic impact studies, as well as foresight, horizon scanning and behavioural insights.

"In the past we have provided knowledge for the development of environment and agriculture policies by looking, for example, at issues like water and air quality," Ms Rute said. "Since there is a very strong demand for evidence on the impact of policies, we are scaling up our capacity on microeconomic, macroeconomic and counterfactual analysis."

To foster mutual understanding between scientists and policy-makers, the JRC is developing a pilot project that would provide fellowships for scientists who work in public administrations in EU Member States. The JRC itself employs international researchers to ensure it works with the best and brightest scientists.

One way of analysing what works and what does not work are the JRC Competence and Knowledge Centres which provide platforms for people from different disciplines, communities and Commission departments.

In addition to formal input into policy debates, experts could also take advantage of informal contacts – for example one to one discussions – to help build trust and establish a rapport with decision-makers. To do this well, scientists would need a strong understanding of the time pressures that policy-makers are under, and experts should work to present evidence in a way that is as appealing and as accessible as possible.

The new normal

A recurring theme in the conference was how to feed evidence into policy-making in the age of 'post-normal science'. The complexity and uncertainty at the heart of many of the most pressing scientific issues of our time make it difficult to communicate with the public and policy communities.

Daniel Sarewitz, Arizona State University, urged participants not to over-simplify the relationship between science and policy. It would be a mistake, he said, to imply that science has a steady supply of answers which would improve society, if politicians would simply listen. "In the background of this room there lurks a general idea that, if policy-makers would take science more seriously, we would take big steps towards solving big problems," he said. "Science advisors should not try to perpetuate the illusion that good science can solve all problems. The trouble is that science is imperfect and complex."

"Science advisors should not perpetuate the illusion that science can solve all problems"

Daniel Sarewitz

There are areas where research and innovation promise to usher in significant improvements but other issues are by their very nature complex, controversial and charged with non-scientific considerations. Science advice on such issues will be equally complex, contested, not straight-forward and problematic. Echoing earlier sentiments expressed by Sir Peter Gluckman, Dr Sarewitz said that rather than being the purveyors of answers, 21st century science advisors should see themselves as knowledge brokers.

There is, however, a great deal of social science research in areas such as communication of science. One of the fundamental findings is that the deficit model, which suggests that the public simply needs more information in order to reach the same conclusions as scientists or policy-makers, has not worked.

Returning to the issue of vaccine uptake, Dr Sarewitz noted that many who reject vaccines are well educated and have access to large volumes of information. While he personally sees vaccines "one of the great miracles of modernity", throwing more information at the problem is not the answer. People knew for decades that smoking is unhealthy, yet many of the policy changes that helped curb smoking rates owe more to research from the social sciences and behavioural economics.

Discussion

A speaker from the floor said scientists were too silent about the success story of vaccination and other areas where science has had a positive impact on our well-being. Dr Sarewitz replied by saying it is not simply a question of "scientific literacy" nor a lack of public awareness of scientists. Jonas Salk, developer of the polio vaccine, is very well known in the US but some people still refuse vaccines. "To caricature it as an information problem is to miss the challenges posed by post-normal science," he said.

Another contributor said the public can find conflicting information on the health value of wine, chocolate and coffee and this undermines trust in science as a provider of solid solutions. Greater input from linguists and cultural scholars is required to make science communication more effective, concluded an audience member – an idea supported by several of the panellists.

The question of whether scientists should propose policy solutions was also raised. Science advisors are not elected, it was noted, and should be limited to presenting options.

Key messages

- Social change puts pressure on the science-policy dialogue
- Science and technology are themselves instruments of social change
- The voices of social sciences must be heard early in policy development
- Science advisors have a role in defining the right questions for policy-makers
- Scientists are increasingly under scrutiny

Parallel session 1.1

Climate change: Science, policy & the road beyond Paris

The discussion centred on the question of how science advice can help in implementing the Paris Agreement (COP 21) adopted in late 2015. Jos Delbeke, Director-General for Climate Action at the European Commission stressed the need to bring in all sectors of society, along with the importance of discussing innovation from diverse fields: mobility, manufacturing, transport, forests and climate science.

Gordon McBean

A broad coalition of policy-makers acting on climate change is needed within national and supranational governmental institutions. Decision-makers must work with others who have distinct and separate responsibilities but who share the goal of tackling the climate crisis. Dr Gordon McBean, President of the International Council for Science, said the various strands of climate change impact should be better integrated, including environmental, social and economic costs. "There is a need for integrated information to provide science advice on possible futures and actions that will make a difference," he said.

Alan Finkel

Dr Alan Finkel, Australia's Chief Scientist, highlighted the public scepticism that climate scientists can meet – with some members of the public simply refusing to accept the scientific consensus. Debunking myths is a challenge, however, and should be done with respect and logic. He said climate information should also show the public the

beneficial role innovation can play in meeting the crisis. As with any communication, messages should be tailored to suit the target group rather than taking a one-size-fits-all approach.

"Social sciences have an important role to play in building bridges between science and the public"

Martin Porter

Social sciences can play a role in building bridges between science and broader publics, according to Martin Porter, Executive Director for Industrial Innovation and EU Affairs at the European Climate Foundation. For example, the European Climate Foundation has studied social transition – a long-term process which can take decades.

Parallel session 1.2

Migration: Evidence-informed responses to humanitarian crises

The migration crisis has a profound humanitarian impact on those directly affected and also poses complex political, social and economic questions. This session heard that the specific challenge of migration is that there are no well-defined policies. Migration is the subject of great discussion but stakeholders and experts are not yet on the same page regarding some fundamental aspects of how to solve the problem, said Dimitrios Giotakos, Head of Unit, Legal Affairs, Directorate-General for Migration and Home Affairs at the European Commission.

Alessandra Zampieri

A key contribution that scientists and policy-makers could make to migration policy would be to agree ways of generating and sharing data securely. In order to address this need, the European Commission has set up a Knowledge Centre on the Demography and Migration at the JRC. Alessandra Zampieri, Head of Demography, Migration and Government Unit at the JRC said the Centre aims to develop a full catalogue of data and scientific advice at global level and translate this knowledge into an immediately understandable format. Clarity is also needed on how data will be used and the ethical issues that arise from this must be considered.

Medical sciences and public health experts have a role to play in addressing the acute physical and mental trauma that migrants can suffer on their journey, as well as managing chronic conditions in the longer term. Aurélie Ponthieu, Humanitarian Specialist on Displacement at *Médecins Sans Frontières*, outlined the implications for policy-makers: measures are needed to ensure safe passage; there is a need for medical and vulnerability screening at reception sites; free and accessible medical care is required at all

"The migrant journey can cause physical and mental trauma"

Aurélie Ponthieu

points of the migrant journey as well as strategies for continuing care. In addition, she called on state authorities to take responsibility for ensuring migrants are well treated.

Patrice Quesada, Senior Emergency and Post-Crisis Specialist at the International Organization for Migration (IOM) presented data on global displacement and migrant flows to Europe. He illustrated how the IOM's Displacement Tracking Matrix allows for the tracking, monitoring and dissemination of detailed information. However, it was noted that evidence and data are often not embraced by policy-makers. It is in crises like this that policy-makers, under considerable public and political pressure, are at most risk of confirmation bias: selecting evidence that supports a decision they are already inclined to take.

Parallel session 1.3

Health: Science advice in short- and long-term challenges – from epidemics to chronic diseases

From infectious diseases like Zika or influenza to chronic conditions such as obesity and diabetes which threaten to undermine economic and social stability, health policy requires considerable expert input.

Xavier Prats Monné, Director-General for Health and Food Safety at the European Commission, said that as well as being a global challenge, health is also an area of immediate everyday interest to the public, meaning that there is an appetite for evidence but also a risk that misinformation can spread quickly.

Science is not the only source of information. For example, as explained by Rémi Quirion, Chief Scientist of Québec, tackling a measles outbreak in Canada required more than simply broadcasting public health information – it was an exercise in communication which involved appealing to the public's values and reframing the issue as one of social responsibility.

> "Health is of immediate everyday interest to the public, meaning that there is an appetite for evidence but also a risk that misinformation can spread quickly"
>
> *Xavier Prats Monné*

This example was a timely reminder that credibility and trust are essential in communicating health science. Scientists or medical professionals should be proactive, particularly on sensitive topics, and resist the temptation to "sit on the fence" when speaking publicly. It was noted that the public trusts those they can identify with: their own doctors, people they know personally or religious leaders.

Roberto Bertollini, former WHO Chief Scientist and WHO representative to the EU, pointed out 'the public' is not a homogenous group with a uniform level of knowledge. Scientists, for example, may be experts in one area but lay-men in others. The particular problems of science advice for health policy include the influence of vested interests related to issues such as obesity or tobacco addiction, an exaggerated perception of personal risk, ambiguous and complex systems for hazard assessment, and the difficulty of implementing the insights of science advice in public health strategies.

Helen Munn, Executive Director of the Academy of Medical Sciences of the UK, gave an overview of the role of academies in providing science advice to health policy-makers, which is to convene expertise, to review evidence and to reach consensus. She said academies are trusted, influential and have the capacity to provide broad and balanced advice. Politicians and the public may turn to academies in times of crisis but it is also important to be proactive and to offer input, Dr Munn added.

Finally, participants acknowledged that health should be discussed in the context of wider social inequity. It would be unrealistic to expect to achieve health equality while promoting inequality elsewhere.

Parallel session 2.1

What is required to build capacity for science advice in developing countries?

Science advice infrastructures vary from country to country. This can be the result of cultural and social traditions, as well as economic development. This session focused on how science and policy interact in low- and middle-income countries (LMIC).

"Low and middle-income countries have different priorities to those of richer countries"

Khotso Mokhele

Khotso Mokhele, Special Advisor to the South African Minister of Science and Technology, said that LMICs have different priorities to those that prevail in richer countries. In addition, the public perception of science and scientists is often low, and policy-makers tend to be reluctant to seek scientific input. For instance, Juan Mayr Maldonado, former Environment Minister of Colombia, mentioned that many politicians in his country do not recognise the fundamental importance of science for post-conflict development.

This implies that a specific skillset is required to bridge the gap between science and policy, according to Carlos Abeledo, University of Buenos Aires. He and other participants shared their experience as evidence brokers in LMICs, advising colleagues to be proactive rather than waiting for a policy-maker to ask for advice.

Juan Mayr Maldonado

Connie Nshemereirwe, Uganda Martyrs University and member of the Global Young Academy, said capacity

building was central to the discussion: scientists must be trained and encouraged to engage with society and policy-makers. Presenting science in plain language is an essential skill which does not come naturally to all experts.

Connie Nshemereirwe

The INGSA African Chapter is building capacity by working with scientists on communication and seeks to deepen their understanding of the policy-making process. The Network is focusing on the up-and-coming generation of African scientists and has launched the African Science Leadership Programme.

Through this and other initiatives it is seeking to identify and share examples of best practice of science advice mechanisms in Africa. Peer support and development will play an important role in accelerating the evolution of science advice in this and other regions.

Parallel session 2.2

What skills do experts and policy-makers need for better dialogue?

As with all communication, improving dialogue between experts and policy-makers requires greater empathy, respect and humility. Both communities must make a determined effort to understand how the other operates and the pressures they are under, according to several contributors to this session.

"Scientists must appreciate the need of policy-makers for well-timed and well-rounded advice", said Mady Delvaux Stehres, Member of the European Parliament's Science and Technology Options Assessment (STOA) Panel. "They must be able to explain the science while the politician walks from one meeting to the next."

This means working across disciplines to provide decision-makers with a holistic view of the problem at hand, and knowing when to reach out to busy politicians to maximise the impact of evidence-based input. And, as democracy is complex, they should not expect their advice to translate swiftly and seamlessly into policy.

> "Scientists must be able to explain the science while the politician walks from one meeting to the next"
>
> *Mady Delvaux-Stehres*
> *Member of the*
> *European Parliament*

For their part, said Julie Maxton, Executive Director of the Royal Society, policy-makers should invest time in framing questions when seeking expert advice and accept that scientists often deal in probabilities rather than certainties.

Just as scientific experts would be wise to assume politicians are unfamiliar with the scientific process, policy-makers should take the time to explain politics and policy-making to scientists.

Speakers working at the interface between evidence and policy spoke of their respect for decision-makers who operate under enormous pressure. This should influence how briefings are prepared. Putting themselves in the shoes of their target audience can help experts to learn to put the key messages on the front page of policy briefs and to choose an engaging, journalistic style of writing, said Ann Mettler, Head of the Political Strategy Centre (EPSC), European Commission.

Arturo Menchaca Rocha, General Coordinator of the Science Advisory Council of the Presidency of Mexico, provided a case study from his country. He said the Council must work across several departments and consider issues ranging from health and the environment to funding and social challenges. This effort can have an impact: scientific advice is helping to reduce breast cancer mortality rates in Mexico, Dr Menchaca Rocha said.

Parallel session 2.3

How can foresight and horizon scanning better inform policy agendas?

Long-term strategic decisions require policy-makers to have a view on how the future might unfold, explained Claire Craig, Director of Science Policy at the Royal Society. Expert knowledge can help decision-makers to identify megatrends. By means of exploring different future scenarios policy-makers can better understand, prepare for and shape future developments.

Melanie Peters, Director of the Rathenau Institute, an independent government think tank in the Netherlands, noted that foresight can be blindsided by disruptive innovation. “Technology is everywhere,” she said. “It can take the form of a radical breakthrough or the application of simple consumer software. This makes it difficult to predict: nobody saw Uber or air bnb coming.”

Tateo Arimoto

However, the process of outlining future scenarios can enhance the capacity to deal with change. It also helps to shape policy orientation and research priorities, as well as triggering public engagement. “We do not seek to predict the future but instead provide a framework for thinking about possible futures and their implications,” said Dr Tateo Arimoto, Director of the GRIPS Innovation, Science and Technology Policy Program.

Fabiana Scapolo, Team Leader Foresight and Horizon Scanning at the JRC, provided examples of foresight exercises that help to explore future scenarios, including a board game where participants model various potential futures on a given topic. This helps to broaden players’ understanding of the various factors that affect social and technological developments. Another resource highlighted during the discussion was a foresight tool that explores how different trends may interact. “We experiment a lot,” said Dr Scapolo. “Our objective is to bring disciplines together, including design thinking and behavioural insights.”

The group discussed ways to make foresight more operational. These include finding ways to better align with the timelines that decision-makers work to, engaging civil society and ensuring a cross-disciplinary approach is taken.

"We experiment a lot and work to bring disciplines together"

Fabiana Scapolo

One of the key insights from the session was that foresight is not only useful in the agenda setting of policy-makers, but also at other stages of the policy cycle, for example for future proofing of the regulatory framework and developing policy recommendations based on scenarios. While there is no recipe for effective foresight exercises, bringing interdisciplinary teams together and using engaging tools have been found to be valuable. As for the future of foresight, a combination of quantitative and qualitative models was put forward as the best approach.

Plenary session III

Scientific advice for transnational structures

Expanding on a theme discussed at the beginning of the conference, this session – moderated by Marcia McNutt, President of the US National Academy of Sciences – looked at the development of science advice infrastructures at transnational level.

Marcia McNutt

Science advice is often developed and disseminated at national level but, given the shared challenges faced internationally – such as climate change and infectious disease outbreaks – supranational organisations have an increasing role. The EU and UN have been developed their science advice structures, notably through the recent establishment of the Scientific Advice Mechanism (SAM) of the European Commission and the Science Advisory Board to the UN Secretary-General.

Professor Henrik Wegener, Executive Vice-President of the Technical University of Denmark and Chair of the European Commission's High-Level Group of Scientific Advisors, said science advice was undergoing something of a renaissance. The SAM, established in late 2015 to provide scientific advice to the European Commission, seeks to better match the supply and demand sides of science advice. It will provide advice that is independent, multi-disciplinary and transparent, he said.

Henrik Wegener

Given the complexity of global challenges and the nature of modern science, one of the crucial tasks for experts and policy-makers is to frame the problem well. "Getting the questions right can be the most important and most difficult part of science advice," Prof Wegener said.

Main features of the European Commission's Scientific Advice Mechanism (SAM)

- High Level Group of seven members
  - Wide range of expertise
  - Providing high quality, timely and independent scientific advice
- Operational support from a secretariat within the Commission's Directorate General for Research & Innovation
- Structured relationship with European Academy Networks
- Drawing on the wide range of scientific expertise in Europe.
- Directly reporting to the College of Commissioners, the political leaders of the European Commission

He set out how the SAM would operate, noting that its seven-member High Level Group (HLG) had the support of a European Commission unit hosting the SAM secretariat. Formal relationships with academies would give the HLG the breadth of expertise required to deal with the wide array of questions that may come their way. Academies, he noted, represent a heretofore underutilised resource. In addition, links to other science advice structures – including the JRC – would ensure that SAM had access to considerable knowledge resources. "We will collaborate and coordinate, bearing in mind that we should not duplicate – we must add value," Prof Wegener said.

"We will collaborate and coordinate, but should not duplicate"

Henrik Wegener

The SAM will deal with short- to long-term policy-making including crisis situations where the College of the European Commission requests input. However, it will also take a proactive approach by identifying areas where scientific advice is needed, and will work to enhance synergies with other science advisory structures.

One of the key principles emphasised by Prof Wegener was transparency: "Everything we do and everything we use should be accessible to the public." This approach is not beyond criticism, with some participants noting that it may preclude the use of commercially-sensitive data. However, transparency advocates said openness is essential to building trust and earning social legitimacy.

The first two topics taken on by SAM at the request of Commissioners are related to cybersecurity and CO_2 emissions of light-duty vehicles. The first step in addressing any issue is to conduct a systematic scoping process to establish what role science can play in informing policy. Then, through evidence gathering and literature review, the group determines what is known about the topic. Scientific expert workshops and stakeholder meetings help to secure input from researchers and other actors. An Opinion of the High-Level Group is then adopted and provided to the College of Commissioners. The first Opinion on light duty vehicle real-drive CO_2 emissions was close to being finalised at the time of the conference.

Professor Jos van der Meer, at the time of the conference Chair of the Board of the 'Science Advice for Policy by European Academies (SAPEA)' project elaborated on the role academies

will play in supporting the work of the SAM. By connecting SAM to Europe's most eminent scientists – selected and elected by their peers on the basis of their expertise – SAPEA would offer "independent, excellent, balanced and timely" input.

The five European academies organisations signed a Memorandum of Understanding for closer collaboration in March 2015, which will also facilitate their contribution to SAM through the SAPEA project. Its 'products' include scoping papers, statements, public hearings, reports and events. "SAPEA wants to be an honest broker in the science advice process," Prof van der Meer said. "We intend to have intensive interaction with the HLG."

Jos van der Meer

Going global

Zooming out to take a global perspective, Zakri Abdul Hamid, Science Advisor to the Prime Minister of Malaysia and Chair of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), said many of humanity's greatest problems require an international response. "All must be met with policies that are clear, agreed upon and powerful," he said. "This is the reason that science is a valuable component of policy-making: science makes policy out of brick, not straw."

"The world has a right to expect that the UN deliver what no other institution can"

Zakri Abdul Hamid

He explained the role of science advice in the UN, with particular emphasis on the Science Advisory Board (SAB) created in 2014 by UN Secretary General, Ban Ki Moon. "The world has a right to expect that the UN deliver what no other institution can," Mr Zakri said. The SAB consists of 13 women and 13 men from a broad range of disciplines including natural and social sciences. In September 2016, the Board presented their report 'The Future of Scientific Advice to the United Nations' to Mr Ban who described the Board as a powerful resource for addressing grand challenges.

Mr Zakri referred to science as a public good which deserves to be used more effectively to reduce global inequalities and achieve the Sustainable Development Goals (SDGs). He also advocated greater investment in research, noting that only 12 countries dedicate more than 2.5% of their GDP to research and development. The UN is calling on developed countries to increase this to 3% of GDP while developing countries should aim to allocate 1% of GDP.

In addition, Mr Zakri said science education for all children should be supported from an early age. "Science can be a game-changer in dealing with the most pressing global challenges if used to its true potential," Mr Zakri said. "It should be integral to all decisions – not an add-on."

Finally, Mr Zakri said the SAB strongly recommends that the next Secretary General of the UN retain the SAB which he said provides a valuable service to the organisation and the world community.

Discussion

A speaker from the floor questioned SAM's decisions to use only data that is in the public domain. This decision, it was suggested, would limit SAM's capacity to see the full picture. Prof Wegener said he wants the public to see how decisions are made and that this would allow greater public scrutiny of their work.

A representative from a non-governmental organisation said SAM's commitment to transparency was welcome. She said citizens can add value by contributing to policy-making and expressed hope that citizens would be given more opportunities to play an active role in SAM's work. Another speaker noted that there are several ways for citizens to feed into EU policy-making and that public consultation is essential.

Prof Wegener was also asked what SAM would do if their work was not applied by policy-makers. He said there is no obligation to use the advice given by SAM and that politicians retain the right to legislate.

Key messages

- Transnational approaches to science advice are needed to meet global challenges
- The European Commission established the Scientific Advice Mechanism in 2015
- The United Nations established a Science Advisory Board in 2014

Plenary session IV

Taking stock

Professor Mark Ferguson, Chief Scientific Advisor to the Government of Ireland and Director General of Science Foundation Ireland, chaired a session with rapporteurs from the first two sets of parallel sessions reporting back to all participants. Prof Ferguson set the scene by giving advice based on his own experience as an evidence broker. He said the key is to identify and answer politicians' questions in order to offer a valuable service. "Scientists should ask politicians: what do you want to achieve and how can I help you?"

Mark Ferguson

Tina Swierczynski

Dr Tina Swierczynski, Executive Secretary of the European Climate Research Alliance, reported on parallel session 1.1 which dealt with climate change. The implementation of the Paris Agreement was emphasised by speakers as a vital way to address climate change and a potential 'big idea' with which to inspire citizens, she said.


Jennifer Cassingena Harper

Jennifer Cassingena Harper, Consultant at the Malta Council for Science and Technology, reported on session 1.2 which focused on migration. She said policy-makers need two kinds of support in reaching informed decisions. On the one hand, scientific input can inform short-term strategies for dealing with the crisis. On the other hand, experts must also anticipate and prepare for the future. One suggestion was to launch a European foresight exercise on migration addressing the diverse perspectives of EU Member States.

Tolu Oni

Tolu Oni, Co-Chair of the South African Young Academy of Science, reported on session 1.3 which tackled health. She said contributors sought to distinguish between health policy and policy for health. The latter acknowledges that determinants of health exist outside the health sector – in social, education, transport, environment and economic policy, amongst others. Obesity was given as an example of a health issue where several policy areas have a role to play.


Sameh Soror

Sameh Soror, Co-Chair of the Global Young Academy, reported on science advice in developing countries which was discussed in session 2.1. Capacity building was the key issue, he said. Scientists need to be trained to produce science advice and more should be done to foster demand from policy-makers and the public for evidence-based input.

David Mair, Head of Geographic Coordination Unit, Joint Research Centre of the European Commission, summarised session 2.2. There is a high degree of consensus on the skills needed for better dialogue, he said. However, as decisions are often informed by emotion, injecting evidence into the process is never easy. He added that it is possible to bring emotion into communication without abandoning facts: science and storytelling need not be mutually exclusive.

David Mair


Marguerite Grandjean

Dr Marguerite Grandjean, Director of Studies at OuiShare reported on session 2.3 which explored the value of foresight exercises. She noted that foresight can help to shape policy priorities and the capacity to deal with change.

Conclusions of day 1

Marga Gual Soler summarised day 1 of the conference by urging participants to move from theoretical discussions to action. Following a number of "science advice experiments" in recent years, she stressed the need to develop robust science advisory systems at national and international levels. In parallel, it is necessary to develop the skill set needed to bridge science and policy, e.g. through fellowships and exchange programmes.


Marga Gual Soer

LIFETIME ACHIEVEMENT AWARD

The first day closed with the presentation of an award by EuroScience, a grassroots association of researchers in Europe. The first recipient of the honour, which recognises 'Lifetime Achievements for European Science and Society' was presented to Robert-Jan Smits, Director-General for Research & Innovation at the European Commission.

"The proposal to nominate Robert-Jan Smits for our inaugural recognition of an individual's Lifetime Achievement for Science and Society is an expression of the high esteem and reputation he has earned through thick and thin, navigating through often challenging circumstances with a level of professionalism and grace that is second to none," Peter Tindemans, Secretary-General of EuroScience, said in his award speech.

DAY TWO

Plenary session V

Cool heads in crises: How to provide timely advice in emergencies

Oil spills, epidemics, earthquakes, nuclear disasters, financial crises and food safety scares: experts may be called upon to explain and respond to emergencies in real time. Science advice is often viewed as a slow, deliberative process feeding into a complex political system. However, when disaster strikes, the rules of the game change in an instant. The timeframe for analysis and advice shortens dramatically and experts are sometimes thrust into the limelight to make public statements or predictions. These pressures can reveal and exacerbate stresses and deficits at the science-policy interface and require the development of robust risk management structures. The specific challenge of emergency situations is that emotions are strongest where there is the greatest need for an unemotional approach.

Rush D. Holt, Chief Executive Officer of the American Association for the Advancement of Science (AAAS) and a former US Congressman, said responding to emergencies requires speed and accuracy. It can also demand that science advisors provide confidential expert advice and play a role in external communications. “A crisis is when a science advisor earns their keep,” he said. “It is when they are most exposed; trust can be gained or lost forever in a few minutes.” Dr Holt added that crises are also an opportunity to understand the process of science advice.

Rush D. Holt

Carthage Smith, Head of the OECD Global Science Forum Secretariat, presented highlights from a 2015 report[3] which reviews national science advice systems. The publication was prompted by two crises: the 2011 Fukushima nuclear disaster in Japan and the earthquake that struck L'Aquila in 2009. It recommends establishing transparent and effective procedures for providing science advice, including clarity on the legal responsibilities and liabilities that apply.

Carthage Smith

Crisis response: stronger science advice systems

To maintain trust when dealing with crises, national authorities should develop:

- Permanent structures or mechanisms
- A central clearing house and contact point
- Clear reporting processes
- A pre-defined public communication strategy
- International coordination

(OECD, 2015)

Dr Smith pointed to some examples of well-established systems built to deal with crises. The UK's Scientific Advisory Group for Emergencies (SAGE) features a high degree of flexibility: its membership depends on the nature of the crisis and it receives input from academia, industry and NGOs depending on the situation.

The OECD is now looking at how different countries respond to crises. It will develop a compendium of national advisory mechanisms and contact points responsible for dealing with emergencies. The Organisation is also building a framework for the timely international exchange of scientific data. A new group has been established to conduct surveys and workshops on these topics and will report back to governments by the end of 2017. This may lead to recommendations on science advice in emergency situations by the OECD Council in 2018.

For Satoru Ohtake, Senior Fellow at the Economic and Social Research Institute of the Cabinet Office of Japan, an emergency plan is only as good as its implementation. "In 2011, the government and local community had an emergency plan but it was found that most of them were prepared in name only," he said.


Satoru Ohtake

In the wake of the Fukushima accident, Japan reflected on the role of scientists in providing advance warning of this disaster and in dealing with catastrophe when it strikes. The Ministry of Foreign Affairs appointed an eminent scientist as the Science and Technology Advisor in September 2015 and efforts continue to improve the quality of science advice of existing advisory bodies including the Council of Science, Technology and innovation.

Mr Ohtake urged experts to think about how society can apply scientific advice. In the case of seismology, for example, forecasts saying there is an 80% chance of a major earthquake in the next 30 years are not actionable.

[3] Scientific Advice for Policy Making, OECD (2105) http://www.oecd-ilibrary.org/science-and-technology/scientific-advice-for-policy-making_5js33l-1jcpwb-en (accessed 12 October 2016)

Fail to prepare, prepare to fail

Vladimír Šucha, Director-General of the Joint Research Centre, European Commission, said quality assurance is a key issue for knowledge brokers in times of crisis. He set out a five-dimensional framework for improving the performance of science advice in emergency situations: prevention, preparedness, response, recovery and reconstruction. The key message was to prepare well and invest in systems for managing knowledge effectively.

Using the example of the 6.0 magnitude earthquake that struck Amatrice, Italy, in August 2016, he detailed how the European Commission services respond to sudden disasters. The earthquake happened at 03:00 and the first map of the affected area was produced in less than two hours. By 09:00 a JRC flash report was circulated, followed by a revised version at 10:30 and a full report at 13:00. Similarly, within minutes of the Fukushima earthquake, a tsunami forecast alert was sent to 22,000 people estimating waves as high as 10 metres. "Speed can be the difference between saving lives and losing lives," he said.

"Speed can be the difference between saving lives and losing lives"

Vladimír Šucha

Other crises can be a shock to the system but unfold on different timescales. The Lehman Brothers bankruptcy in September 2008 caused havoc in financial markets and rattled consumers. Based on scientific modelling and analysis, the European Commission acted within months to introduce an increased level of protection for bank deposits. By guaranteeing deposits up to €100,000, an estimated 90% of European deposits were safeguarded.

Recovery mode

The emotional impact of emergencies was highlighted by Eva Alisic of Monash University, and Immediate Past Co-Chair of the Global Young Academy. Evidence-based strategies can help to provide psychosocial support for those affected by disasters. For example, restoring victims' sense of safety and control, providing a calm environment, and offering hope can help people to recover from highly traumatic experiences. "We know most people can deal with a traumatic event and it's good for people to know that," she said. "Giving victims a realistic sense of optimism in being able to deal with a crisis helps their recovery later on."

"It's good for people to know that they can recover from trauma"

Eva Alisic

Building capacity in the area of evidence-based emergency response is essential. The ability to work in a team and to take a comprehensive approach are equally important. The Global Young Academy network is a group of relatively young people involved in science communication, science outreach, science education and science advice. Through training and workshops, as well as long-term interdisciplinary projects, they are working to break down barriers between scientists and policy-makers.

Discussion

During the discussion with the audience, the role of the media in communicating during crisis was emphasised. As with other elements of crisis response, establishing relationships and building trust before disaster strikes is essential.

The public demand for information is heightened during a crisis which can thrust experts into the spotlight. Media training for scientists, advisors and others who may be called up on to engage with the media and the public should be provided.

Key messages

- Emergencies put the interface between science and policy under acute pressure
- The challenge is to respond quickly while maintaining accuracy and trust
- Building resilient systems and science advice mechanisms can help prepare for crises

Parallel session 3.1

Lost in translation? Science advice, media and social media

Sir Philip Campbell

Sir Philip Campbell, Editor-in-Chief of Nature and Nature publications, chaired the session which addressed the ways in which specialist, mainstream and social media act as intermediaries between science, the public and policy-makers.

The session heard that many media organisations are under financial pressure. In developing countries, this can mean that journalists ask for payment to attend press conferences because their pay is so low; in developed countries, it means journalists must cover a broad range of topics, producing more content for more platforms than ever before. In New Zealand, for example, there are no journalists dedicated full-time to science at the major newspapers. The future will see generalists covering specialist topics and this implies less in-depth coverage. A broad social discussion is required on how we value quality news media, said Linda Nordling, a freelance journalist.

"We need to have a discussion about how we value quality news media"

Linda Nordling

Social media was a frequent topic of discussion: there are 1.7 billion people on Facebook, sometimes discussing scientific topics. However, as Sixtine Bouygues, Deputy Director-General of DG Communication, European Commission, noted, it is often fast and unfiltered, allowing rumours and myths to spread unfettered, while allowing people to confirm their own biased opinions. Another result of the social media age is the tendency for all news organisations to opt for 'click bait' headlines – news stories with sensational titles designed to surprise and shock readers in order to generate advertising revenue. However, social media also brings new opportunities to engage the public and, in terms of tactics, there are lessons to be learned from NGOs.

Sixtine Bouygues

Erika Widegren, Chairwoman of the Advisory Board of REIsearch, said it was also generally acknowledged that scientists and policy-makers are ill-equipped to communicate about science and its implications in the modern media environment. This undermines trust in scientists as an authoritative source.

Erika Widegren

Parallel session 3.2

How can national academies best contribute to science advice for policy?

Academies can play an important role in generating and disseminating knowledge, said Thierry Courvoisier, President-elect of the European Academies Science Advisory Council (EASAC). They are viewed as being independent from vested interests which is an important source of public trust, he said. Academies can be a credible partner for policy-makers and provide a neutral space for public dialogue on scientific issues.

"Academies can be a credible partner for policy-makers and provide a neutral space for public dialogue on scientific issues"

Thierry Courvoisier

Some academies provide direct advice to politicians, some liaise behind-the-scenes with officials, while others engage with the public and provide databases of information and expertise.

However, it was noted that there is great diversity among academies around the world. Even within Europe, there are distinctly different traditions. László Lovász presented the Hungarian Academy of Sciences as an example of an academy from a former socialist country. It has three roles: as a learned society, a research network and a distributor of research funding. The organisation operates independently but is state-funded. Academies in other countries have more diverse sources of funding. The Hungarian Academy, because of its historical structures, played a central role in responding to Hungary's 'Red Sludge Disaster' in 2010 where a waste reservoir spilled 1 million cubic metres of liquid on villages.

László Lovász

Funding remains a challenge for all academies. To preserve their independence, they must be cautious about where they source financial support. Other conflicts also loom: the role of academies as advocates for science – often campaigning for greater research funding – should be clearly separated from their scientific advisory role.

Suad Sulaiman

Professor Suad Sulaiman, Sudanese National Academy of Sciences provided a history of science in Sudan. Funding, she said, was scarce and restrictions on external fund transfers are a major challenge for researchers. Sudanese expatriates are an important source of support and the Sudanese National

Academy of Sciences is keen to build on this strong community of researchers who work abroad. The Academy hopes young researchers will become more confident in Sudan as a location with future career opportunities. "In order to achieve our goals we need local infrastructure and funding so that we can have an office with a dedicated secretariat," she said.

Finally, participants warned that enhancing the capacity and status of academies in developed countries could exacerbate global inequalities as the poorest nations fall further behind.

Parallel session 3.3

What are the roles of citizens and civil society in science advice?

Dame Anne Glover

Heather Douglas

Citizen input into policy development promises to make science policy more democratic, more credible and better informed, according to Dame Anne Glover, Vice-Principal for External Affairs and Dean for Europe, University of Aberdeen, who chaired the session.

Participants proposed shifting from this 'linear' approach to a more dynamic 'trilogue' between science, policy-makers and citizens. This would improve the capacity for capturing diverse value judgements when crafting policies in areas of high tension, according to Heather Douglas, Waterloo Chair in Science and Society, University of Waterloo.

Citizens can help to frame issues; advise on the level of uncertainty that is socially acceptable; highlight potential vulnerabilities in policy options; and ensure decision-makers focus on the common good and justice issues. The public can also bring relevant knowledge to the debate, said Ulrike Felt, Dean of the Faculty of Social Sciences at the University of Vienna.

New coalitions from broad social groups can help to move forward on challenging issues which are traditionally 'owned' by science. Marcelo Sánchez Sorondo, Chancellor of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences, said religious organisations can play an influential role. An example cited during the discussion was the role of the Papal Encyclical – which contains strong scientific messages thanks

"The public brings relevant knowledge to the debate"

Ulrike Felt

to the input of the Pontifical Academy of Sciences – along with the IPCC in adding momentum ahead of the COP21 meeting in Paris in 2015.

The group concluded that there is a good return on investment in open, deliberative democratic learning processes that embrace divergent viewpoints.

Marcelo Sánchez Sorondo

Parallel session 4.1

Science advice across boundaries: learning from each other

A diverse range of actors have roles to play in cross-border science advice, according to Hubert Deluyker, Scientific Advisor to the Executive Director, European Food Safety Authority (EFSA), who chaired the session. Collaboration between these bodies is essential to finding shared solutions to common challenges. A vital first step is understanding the structures in place around the world.

Hubert Deluyker

Chandrika Nath

This session heard lessons from experienced practitioners and users of science advice for policy in three countries: the UK, Estonia and Japan. Participants agreed that stronger science advisory services were required in national parliaments. Chandrika Nath, Acting Director of the UK Parliamentary Office of Science and Technology outlined her Office's role in informing political debate. It was viewed as an example of a well-developed operation with a strong institutional presence.

The discussion also addressed the role of science advice in times of crisis. Yasushi Sato, Centre for Research and Development Strategy, Japan Science and Technology Agency, said the 2011 earthquake, tsunami and nuclear accident in Japan were an example where

the science community could have acted more swiftly. Public trust in science declined in the wake of the crisis. Best practice guides on how to deal with emergencies would be valued by the science advisory community.

Turning to longer-term challenges, participants suggested learning lessons from the experience of the International Panel on Climate Change (IPCC) where scientists and policy-makers collaborate in writing reports to ensure they are technically sound as well as relevant to policy discussions.

Yasushi Sato

"We need good scientists in every parliament"

Ene Ergma

One way experienced scientists could play an active role in parliamentary debate is to run for office, said Ene Ergma, former Speaker of the Parliament of Estonia and an astrophysicist. "It is not enough for scientists to do excellent research," she said. "We need good scientists in every parliament."

Parallel session 4.2

Science in the implementation of the Sustainable Development Goals

"Nobody expected the oil price ever to drop below 80 USD per barrel"

Pavel Kabat

The implementation of the UN's 17 Sustainable Development Goals (SDGs) by 2030 will require considerable expert input, collaboration across borders and disciplines, and capacity building in developing countries, said Charlotte Watts, Chief Scientific Advisor at the UK Department for International Development, who chaired the session.

Science-policy dialogue around the SDGs is growing but must move past the planning stage, according to Pavel Kabat, Director-General and CEO of the International Institute for Applied Systems Analysis (IIASA). He stressed the need for integrated, cross-sectorial assessments, while pointing to the challenges in predicting the future. For instance, a few years ago not even the oil companies were expecting the oil price ever to drop below 80 USD per barrel.

Mu Rongping told the session how China is aiming to fulfil its development goals. The Chinese Academy of Sciences is enhancing its advisory capacity and influencing the design of plans and systems at national, regional and local levels. China's role in the success of the SDGs is significant given the size of its population.


Charlotte Watts

Research platforms such as the Future Earth programme can contribute knowledge which will advance the SDGs, said Daya Reddy, President of the Academy of Science of South Africa and President-elect of ICSU. The need to connect international efforts with local initiatives was also highlighted. To maximise their impact on the Goals, researchers will need a strong understanding of the legal, institutional and governmental systems required to deliver change.

Mu Rongping

The role of citizens was also discussed. Citizens should be included in programmes as early as possible rather than being an afterthought. One way to improve the chances of social legitimacy is to integrate social sciences and humanities research when working towards reaching the SDGs.

Daya Reddy

Parallel session 4.3

Shifting frontiers of science diplomacy

Science diplomacy may be defined in a number of ways. It can refer to the role of science in diplomacy, where scientists inform policy debates at the transnational level; the use of science to promote relationships between countries who are otherwise not on good terms; and the role of diplomats in helping science by developing large research infrastructures and programmes.

Romain Murenzi

Romain Murenzi, UNESCO Director for Science Policy and Capacity Building, chaired the debate which highlighted some of the challenges facing science diplomacy including the declining status of evidence in policy debates, the rise of 'click journalism', and the need for capacity building among diplomats and scientists.

Robin Grimes

This parallel session looked at the role of individuals giving advice across borders. Here, experts must be cognisant of cultural divides and historical sensitivities in order to maintain credibility. Humility and transparency can help to build trust, said Robin Grimes, Chief Scientific Advisor to the UK Foreign and Commonwealth Office.

Shaukat Hameed Khan

Shaukat Hameed Khan, Coordinator-General of the Ministerial Standing Committee on Scientific and Technological Cooperation of the Organization of Islamic Cooperation (OIC), explained the role of the OIC. Members assist one another in developing scientific capacity through a Science & Technology Committee, he said. Some of the 57 members of the organisation have well-developed science and technology systems while others are less advanced. There is active cooperation despite cultural and political differences. Similarly, there is growing cooperation between African nations.

Finally, from an EU perspective, science diplomacy is at the heart of the European strategy for international collaboration, said Maria Cristina Russo, Director for International Cooperation, DG Research and Innovation at the European Commission. "The EU is leading the way in developing global research and innovation partnerships to address challenges in areas such as climate change, health, food, energy and water," she said. "And we are translating our lead in science into a leading voice in global debates, helping the convergence of scientific opinions on the basis of all data and evidence available globally." EU funding is critical for international research infrastructures such as SESAME, she added, and Horizon 2020 is the only significant international funding programme which plays a role in international scientific cooperation.

"The EU is leading the way in developing global research and innovation partnerships"

Maria Cristina Russo

Plenary session VI

Taking stock 2

Oladoyin Odubanjo

Science advice to governments is not the exclusive preserve of formally-appointed science advisors. In practice, many players have a role. The third parallel sessions looked at how the media, national academies and citizens contribute to the dialogue between science and policy. In the fourth round of discussions, the challenges and opportunities that arise from advising across boundaries and borders were explored. Oladoyin Odubanjo, Executive Secretary of the Nigerian Academy of Science, chaired this round-up of feedback from parallel session rapporteurs.

Peter Griffin

Peter Griffin, founder and manager of the Science Media Centre in New Zealand, reported on session 3.1 He noted that the public still gets most of its information on science-related issues from the mainstream media. Any discussion of how media organisations treat scientific topics should begin by recognising that journalism is in crisis: the business model underpinning the news media is broken, placing severe pressure on resources, science journalists being among the first casualties.

Sofie Vanthournout, Director of Sense About Science EU, summarised session 3.2. She said that there is broad agreement that academies can play an important role in generating and disseminating knowledge. She outlined the diversity in how academies are structured and funded, and how this influences their role in society and policy-making.

Sofie Vanthournout

Dr Martin Kowarsch, Mercator Research Institute on Global Commons and Climate Change, reported on session 3.3. He said that that while policy-makers often use mechanisms for stakeholder consultation, these are frequently insufficient. He said there are compelling reasons for involving citizens early in the policy formation process rather than asking their opinion after a report has been written or a decision has been framed.

Martin Kowarsch

Dr Lauri Hetemäki, European Forestry Institute, reported on session 4.1. He said that that mapping of best practices and cases studies of parliament science advice services could help to raise standards around the world. INGSA, it was suggested, could play a role in conducting this mapping exercise.

Lauri Hetemäki

Sergio Jorge Pastrana, Foreign Secretary and Executive Director of the Academy of Sciences of Cuba, reported on session 4.2. He said several speakers had noted the need to link global goals – such as the SDGs – with local actions. The large volume of targets set out in the SDG mean some degree of prioritisation will be required in order to configure local and national programmes. Citizens will play a key role in determining whether the SDGs are achieved and they should be central to developing action in this area.

Sergio Jorge Pastrana

Kari Raivio

Kari Raivio, Vice-President of ICSU, reported on session 4.3 at the conference. He outlined how the discussion showed the declining importance of evidence in policy debates. The session illustrated the value of training diplomats and scientists in the art of storytelling so that they can communicate and collaborate.

Plenary session VII

Strengthening the use of science advice in policy

The concluding session of the conference addressed ways to strengthen evidence-based policy in a climate where facts are often neglected in favour of emotional or political concerns. As participants reflected on the topics tackled during the two-day conference, speakers discussed the respective roles of the European Commission, INGSA, the International Council for Science (ICSU) and the scientific community in the future of science advice.

> 'We call for concerted action of scientists and policy-makers to define and promulgate universal principles for developing and communicating science to inform and evaluate policy based on responsibility, integrity, independence and accountability.'
>
> World Science Forum 2015


James Wilsdon

James Wilsdon, University of Sheffield, Vice-Chair of the International Network for Government Science Advice (INGSA) said the task now is to develop a set of Principles and Guidelines for Scientific Advice for Policy – as requested by the World Science Forum in 2015. A working group meeting on this topic was held ahead of the conference.

Marc Saner, Institute for Science, Society and Policy, University of Ottawa, reported back from this working group meeting and outlined the process for drafting these principles. The working group is reviewing a large volume of documents to draw up a long-list of principles and guidelines. 40 people from 20 nations, along with more than a dozen from the Global Young Academies, have discussed which ones to prioritise. Three events are scheduled in the year ahead in South Africa, Jordan and the United States to take the discussion forward. The goal is to report back to the WSF in Jordan in late 2017. Rather than presenting a final, definitive set of guidelines, it may be that a draft could be shared and discussed in Jordan.

"If the main challenge is communication, empathy is essential to success"

Marc Saner

Dr Saner revealed an abbreviated list of some of the principles that are under consideration: independence, transparency, integrity, diversity and respect for limits. He also set out headings that could shape the guidelines: roles and responsibilities; identify and frame the issues; ensure capacity to use evidence; acknowledge uncertainties; consult widely; and quality assurance.

Other issues emerging from a workshop on the topic – and which reflect recurring themes arising at this two-day conference – include the need to overcome the challenge of communicating science to the public and policy-makers. "Empathy is an important principle," Dr Saner noted. "If the main challenge is communication – between science and decision-makers, and between international communities – empathy is essential to success."

Where to now?

Heide Hackmann, Executive Director of the International Council for Science (ICSU), reflected on the two-day discussion and looked at where the science advice agenda goes from here. She noted that the conversation was not only about advice per se but also addressed scientific knowledge production and its use. "The task now for INGSA is to ask how all of this applies to the business of science advice," she said.

Heide Hackmann

INGSA can play a central role in mobilising scientific expertise on issues of global concern – such as climate change and the SDGs – and to play an active role in various UN bodies. In that context, the Network can make the case for science-based policy. Looking ahead, issues of diversity, interdisciplinarity, and transparency will shape the future of science advice on the international stage.

Openness was a theme taken up by Wolfgang Burtscher who serves as the European Commission's Deputy Director-General for Open Innovation, Open Science, Open to the World at the Directorate-General for Research and Innovation. He highlighted the fact that transparency and independence are two of the cornerstones of the Commission's new SAM, reminding participants that all material used by the SAM High Level Group will be published online.

Wolfgang Burtscher

The SAM will be in continuous direct exchange with decision-makers in the European Commission, helping them to craft informed robust policies that will stand up to scrutiny from the European Parliament, Member States and European citizens.

Mr Burtscher also noted that the appetite for science advice is strong in the Commission: "We are happy that the pipeline of issues that will require scientific advice is growing by the day." Reflecting on the conference, he added that the event has been an important step in bridging the gap between science and policy-making.

"We have had honest, mind-stretching conversations which were much-needed"

Sir Peter Gluckman

The closing address was delivered by Sir Peter Gluckman, Chair of the International Network for Government Science Advice (INGSA) and Chief Science Advisor to the Prime Minister of New Zealand. He reflected on a stimulating two days and promised to take this momentum into a series of meetings planned for the months and years ahead. "We have had honest – sometimes audacious – mind-stretching conversations which were much-needed in this space," he said.

The approximately 450 participants and 90 speakers who contributed in Brussels, along with those following online, showed that there is a critical mass of people willing to engage on this topic. The key messages which emerged from this conference will fuel the process of the identification of

principles and guidelines for science advice to government. All participants are invited to further contribute to this process, e.g. through the blog on the INGSA website. Reflections and comments related to this conference can be communicated through twitter #EUINGSA16 and will be put on the conference website.

Conclusions

The conference addressed the state-of-the-art of science advice around the world. The era of post-normal science is changing the relationships between science, policy-makers and the public. The need for greater mutual understanding was repeatedly emphasised throughout the two-day event. It was broadly agreed that 'evidence brokers' are needed at the interface between science, policy and society who speak the language of all spheres.

The global dimension of informing policy development was also frequently highlighted. Many of the biggest challenges facing humanity require a response at international level. Climate, migration and health were cited as examples of policy areas where collaboration between countries and institutions, along with input from transnational organisations, will be essential.

All of this makes it an exceptional and exciting time to work at the interface between science and policy. After a successful 2nd conference of the International Network for Government Science Advice, this strong and vibrant community is keenly anticipating the 3rd conference in Tokyo in 2018.

Take home messages

General

- Evidence, including from social science, must be an integral part of policy development
- Science advisors need to guide policy-makers in making sense of the plethora of information
- Science influences, and is influenced by, a wider societal and political ecosystem
- Science advisors have a role in defining the right questions for policy-makers

Changing society/ changing requirements to science advice

- Science is in a 'post normal' phase, characterised by uncertainty, dispute of values, high stakes and an urgent need for decisions
- Science advisors must not only provide the evidence, but also explain the process by which it was obtained
- Social change entailing complex issues such as urbanisation, migration, digitisation and automation puts pressure on the science-policy dialogue
- Science and technology are themselves instruments of social change
- Scientists are increasingly under scrutiny
- Transnational approaches to science advice are increasingly needed to meet global challenges, but local and regional aspects must also be considered

Communication

- This conference showed there is a willingness to collaborate to bridge the gap between science and policy.
- Just as policy-makers can deepen their insight into the scientific world, scientists need a better understanding of the specific needs of politics and policy-making
- 'Evidence brokers' are needed at the interface between science, policy and society who speak the language of all parties and developing the required skills will help to foster evidence-informed policies
- In addition to communication and transparency, science advice needs the engagement of civil society to negotiate the interface between science and values'.

Science advice in emergency situations

- Emergencies put the interface between science and policy under acute pressure
- The challenge is to respond quickly while maintaining accuracy and trust
- Building resilient systems and science advice mechanisms can help prepare for crises

Recent and future developments

- The European Commission's Scientific Advice Mechanism , established in 2015, will provide high-quality scientific advice in an independent, multi-disciplinary and transparent way
- The United Nations established a Science Advisory Board in 2014 as a resource of scientific evidence for addressing grand challenges such as sustainable development, climate change, food security and health
- Contributions to the ongoing work for the preparation of principles and guidelines for science advice ahead of the World Science Forum in Jordan in late 2017, e.g. through the blog on the INGSA website, are welcome.

DAY ONE › THURSDAY 29TH SEPTEMBER

08:15-09:00 Registration and coffee

09:00-09:40 **Opening session** — GASPERI

Welcome › **Robert-Jan SMITS**, Director-General for Research and Innovation, European Commission

Opening address › **Carlos MOEDAS**, European Commissioner for Research, Science and Innovation

Opening address › **Tibor NAVRACSICS**, European Commissioner for Education, Culture, Youth and Sport

Setting the scene › **Sir Peter GLUCKMAN**, Chair of the International Network for Government Science Advice (INGSA), Chief Science Advisor to the Prime Minister of New Zealand

09:40-10:50 **Plenary session I: Deepening the dialogue** — GASPERI

The interaction of science and policy making in a changing world: How can policy better utilise the resources of science in the digital age? What do scientists and policy makers need to do differently to ensure a more effective use of scientific evidence in policy? What do scientists need to know about the world of policy makers and vice versa?

CHAIR **Danuta JAZŁOWIECKA**, Member of the European Parliament, Member of the Science and Technology Options Assessment (STOA) Panel

SPEAKERS **HRH Princess Sumaya bint El HASSAN**, President of the Royal Scientific Society of Jordan, Chair of the World Science Forum 2017

Flavia SCHLEGEL, UNESCO Assistant Director-General for the Natural Sciences

Yuko HARAYAMA, Executive Member of the Council for Science and Technology Policy, Cabinet Office of Japan

Bernhard URL, Executive Director of the European Food Safety Authority (EFSA)

Clare MATTERSON, Director of Strategy, Wellcome Trust

10:50-11:20 Coffee break

11:20-12:30 **Plenary session II: Solution-oriented scientific advice** — GASPERI

How to provide policy makers with interdisciplinary, solution-oriented advice in practice:

- Integrating natural, social and behavioural sciences into policy advice
- The interaction between science and decision making
- Applying science in times of social transformation
- Opportunities and challenges for science advice in the age of big data
- Social license for science advice: How to build institutional legitimacy

CHAIR **Rolf-Dieter HEUER**, Former Director-General of CERN, Member of the European Commission's High-Level Group of Scientific Advisors

SPEAKERS **Daniel SAREWITZ**, Director of the Consortium for Science, Policy and Outcomes, Arizona State University

Maive RUTE, Deputy Director-General of the Joint Research Centre (JRC), European Commission

Pearl DYKSTRA, Erasmus University of Rotterdam, Member of the European Commission's High-Level Group of Scientific Advisors

Jacques LUKASIK, Secretary-General of the European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE)

Dame Helen WALLACE, Member of Academia Europaea and Fellow of the British Academy

12:30-13:30 Lunch

13:30-14:45 **Parallel session I: Responding to global policy challenges**

There are an increasing number of global issues that require science advice. Can science advice help to address global issues requiring action at international level? What are the considerations for providing science advice in these contexts? What are the examples from which we can learn what works and what does not work in informing policy-making through science advice at the global level?

GASPERI

Parallel 1.1 › Climate change: Science, policy & the road beyond Paris

CHAIR **Jos DELBEKE**, Director-General for Climate Action, European Commission

SPEAKERS **Gordon McBEAN**, President of the International Council for Science (ICSU)

Alan FINKEL, Australia's Chief Scientist

Martin PORTER, Executive Director Industrial Innovation and EU Affairs, European Climate Foundation (ECF)

RAPPORTEUR **Tina SWIERCZYNSKI**, Executive Secretary of the European Climate Research Alliance (ECRA)

JENKINS

Parallel 1.2 › Migration: Evidence-informed responses to humanitarian crises

CHAIR **Dimitrios Giotakos**, Head of Unit, Legal Affairs, Directorate-General for Migration and Home Affairs, European Commission

SPEAKERS **Alessandra ZAMPIERI**, Head of Demography, Migration and Governance Unit, Joint Research Centre of the European Commission

Patrice QUESADA, Senior Emergency and Post Crisis Specialist, International Organization for Migration (IOM)

Aurélie PONTHIEU, Humanitarian Specialist on Displacement, Médecins Sans Frontières

RAPPORTEUR **Jennifer Cassingena HARPER,** Consultant, Malta Council for Science and Technology

MANSHOLT

Parallel 1.3 › Health: Science advice in short- and long-term challenges – from epidemics to chronic diseases

CHAIR **Xavier PRATS MONNÉ**, Director-General for Health and Food Safety, European Commission

SPEAKERS **Roberto BERTOLLINI**, Former WHO Chief Scientist and WHO Representative to the European Union

Rémi QUIRION, Chief Scientist of Québec

Helen MUNN, Executive Director, Academy of Medical Sciences (UK), Member of the Federation of European Academies of Medicine (FEAM)

RAPPORTEUR **Tolu ONI**, University of Cape Town, Co-Chair of the South African Young Academy of Science

14:45-15:15 Coffee break

15:15-16:30 **Parallel session II: Brokers and boundary-crossers: Developing the practice of science advice**

The practice of science advice to public policy requires a new set of skills that are neither strictly scientific nor policy-oriented, but a hybrid of both. Negotiating the interface between science and policy requires translational and navigational skills that are often not acquired through formal training and education and which may differ in different parts of the world. In addition, new techniques are being developed, e.g. in foresight and horizon scanning, which may increase the impact of science on policy. What are the considerations in developing these unique capacities, both in general and for particular contexts?

JENKINS

Parallel 2.1 › What is required to build capacity for science advice in developing countries?

CHAIR **Khotso MOKHELE**, Special Advisor to the South African Minister of Science and Technology

SPEAKERS **Juan MAYR MALDONADO**, Former Environment Minister of Colombia and Chair of the UN Conference on Biosafety

Connie NSHEMEREIRWE, Uganda Martyrs University, Member of the Global Young Academy

Carlos ABELEDO, Director of the Graduate Program in Science and Technology, University of Buenos Aires

RAPPORTEUR **Sameh SOROR**, Helwan University, Co-Chair of the Global Young Academy

GASPERI

Parallel 2.2 › What skills do experts and policy-makers need for better dialogue?

CHAIR **Ann METTLER**, Head of the European Political Strategy Centre (EPSC), European Commission

SPEAKERS **Julie MAXTON**, Executive Director of the Royal Society

Mady DELVAUX-STEHRES, Member of the European Parliament, Member of the Science andTechnology Options Assessment (STOA) Panel former Minister for Education of Luxembourg

Arturo MENCHACA ROCHA, General Coordinator of the Science Advisory Council of the Presidency of Mexico

RAPPORTEUR **David MAIR**, Head of Geographic Coordination Unit, Joint Research Centre of the European Commission

MANSHOLT

Parallel 2.3 › How can foresight and horizon scanning better inform policy agendas?

CHAIR **Claire CRAIG**, Director of Science Policy, Royal Society

SPEAKERS **Melanie PETERS**, Director of the Rathenau Institute

Tateo ARIMOTO, Director of the Innovation, Science and Technology Policy Program, National Graduate Institute for Policy Studies (GRIPS)

Fabiana SCAPOLO, Deputy Head of Foresight, Behavioural Insights & Design for Policy Unit, Joint Research Centre of the European Commission

RAPPORTEUR **Marguerite GRANDJEAN**, Director of Studies, OuiShare

16:30-16:45 Break

16:45-17:30 **Plenary session III: Scientific advice for transnational structures** GASPERI

Policy makers throughout the world are increasingly facing the need to address issues that cannot be tackled at national level, but need transnational approaches. Thus policies are increasingly being developed directly at the level of supranational organizations such as the EU or the UN, whose policy making processes need to build up their own advisory mechanisms. Providing advice to supranational entities necessitates the development of tailor-made structures adapted to their specific needs, based on principles, which are common to the variety of existing structures in different countries. This session will present two examples of such science advice structures for supranational organisations: the new Scientific Advice Mechanism of the European Commission and the Science Advisory Board to the UN Secretary-General.

CHAIR **Marcia McNUTT**, President of the National Academy of Sciences, USA

SPEAKERS *The European Commission's Scientific Advice Mechanism*
Henrik C. WEGENER, Executive Vice-President of the Technical University of Denmark, Chair of the European Commission's High-Level Group of Scientific Advisors

The Role of the Academies in the Scientific Advice Mechanism and beyond
Jos van der MEER, President of the European Academies Science Advisory Council (EASAC)

The UN Secretary General's Science Advisory Board
ZAKRI Abdul Hamid, Science Advisor to the Prime Minister of Malaysia and Chair of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)

17:30-18:30 **Plenary session IV: Taking stock** GASPERI

CHAIR **Mark FERGUSON**, Chief Scientific Adviser to the Government of Ireland and Director General of Science Foundation Ireland

SPEAKERS Rapporteurs of the parallel sessions I and II:

1.1 **Tina SWIERCZYNSKI**
1.2 **Jennifer Cassingena HARPER**
1.3 **Tolu ONI**

2.1 **Sameh SOROR**
2.2 **David MAIR**
2.3 **Marguerite GRANDJEAN**

18:30-18:45 **Conclusions of the first day** GASPERI

Marga GUAL SOLER, Project Director, Centre for Science Diplomacy, American Association for the Advancement of Science (AAAS)

18:45-19:00 **2016 Recognition of Lifetime Achievements for Science & Society** GASPERI

presented by **Lauritz HOLM-NIELSEN**, President of EuroScience

19:00 **Evening Reception**

Including launch of the Palgrave Communications special thematic collection on 'Science Advice to Governments'

DAY TWO › FRIDAY 30TH SEPTEMBER

08:00-08:30 Registration

08:30-08:40 **Re-cap and plan for day 2**

Johannes KLUMPERS, Head of Scientific Advice Mechanism Unit, DG Research and Innovation, European Commission

08:40-09:50 **Plenary session V: Cool heads in crises: How to provide timely advice in emergencies** GASPERI

The Sendai Framework for Disaster Risk Reduction, adopted in 2015, has flagged not only the importance of science for disaster preparedness, but also the need for developing the science-policy interface for a more effective decision making in disaster risk management. The gap between decision-makers and science advisory systems must close rapidly in crises where advisors have more direct input into decision-making and can play a central role in public outreach and communication. This session will showcase some of the key developments at global level that will lead to a better quality of science advice in crisis situations.

CHAIR **Rush D. HOLT,** Chief Executive Officer of the American Association for the Advancement of Science (AAAS)

SPEAKERS **Carthage SMITH**, Head of the OECD Global Science Forum Secretariat

Vladimir ŠUCHA, Director-General of the Joint Research Centre (JRC), European Commission

Eva ALISIC, Monash University, Immediate Past Co-Chair of the Global Young Academy

Satoru OHTAKE, Senior Fellow at the Economic and Social Research Institute of the Cabinet Office of Japan

09:50-10:00 Break

10:00-11:15 **Parallel session III: Science advice for and with society**

In many ways, the practice of science advice has become a key pillar in what has been called the 'new social contract for science'. Science advice translates knowledge, making it relevant to society through both better-informed policy and by helping communities and their elected representatives to make better-informed decisions about the impacts of technology. What considerations are there in an increasingly open practice of science advice?

JENKINS

Parallel 3.1 › Lost in translation? Science advice, media and social media

CHAIR **Sir Philip CAMPBELL**, Editor-in-Chief of Nature and Nature publications

SPEAKERS **Sixtine BOUYGUES,** Deputy Director-General of DG Communication, European Commission.

Erika WIDEGREN, Chairwoman of the Advisory Board of REIsearch

Linda NORDLING, Freelance Journalist

RAPPORTEUR **Peter GRIFFIN**, Director of the New Zealand Science Media Centre

GASPERI

Parallel 3.2 › How can national academies best contribute to science advice for policy?

CHAIR **Thierry COURVOISIER**, President-elect of the European Academies Science Advisory Council (EASAC)

SPEAKERS **László LOVÁSZ**, President of the Hungarian Academy of Sciences

Ricardo SERRÃO SANTOS, Member of the European Parliament

Suad SULAIMAN, Member of the Executive Committee, Sudanese National Academy of Sciences

RAPPORTEUR **Sofie VANTHOURNOUT**, Director of Sense about Science EU

MANSHOLT

Parallel 3.3 › What are the roles of citizens and civil society in science advice?

CHAIR **Dame Anne GLOVER**, Vice-Principal for External Affairs and Dean for Europe, University of Aberdeen

SPEAKERS **Heather DOUGLAS**, Waterloo Chair in Science and Society, University of Waterloo

Marcelo SÁNCHEZ SORONDO, Chancellor of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences

Ulrike FELT, Dean of the Faculty of Social Sciences, University of Vienna

RAPPORTEUR **Martin KOWARSCH**, Mercator Research Institute on Global Commons and Climate Change

11:15-11:45 Coffee break

11:45-13:00 **Parallel session IV: Advising across boundaries and borders**

Science advisors and advisory mechanisms are called upon not just for nationally relevant advice to their governments, but also for issues that increasingly cross boundaries and borders. In so doing, their bridging roles may be called upon to span scientific disciplines, jurisdictions or institutional boundaries. What are the related challenges, including judicial issues, and how can they be overcome? To what extent are science advisory systems also diplomatic or parliamentary tools, and what are the implications of this in practice?

GASPERI

Parallel 4.1 › Science advice across boundaries and borders: learning from each other

CHAIR **Hubert DELUYKER**, Scientific Adviser to the Executive Director, European Food Safety Authority (EFSA)

SPEAKERS **Chandrika NATH**, Acting Director of the UK Parliamentary Office of Science and Technology

Ene ERGMA, Former Speaker of the Parliament of Estonia

Yasushi SATO, Centre for Research and Development Strategy, Japan Science and Technology Agency

RAPPORTEUR **Lauri HETEMÄKI**, Assistant Director of the European Forest Institute

JENKINS

Parallel 4.2 › Science in the implementation of the Sustainable Development Goals

CHAIR **Charlotte WATTS**, Chief Scientific Advisor at the UK Department for International Development (DFID)

SPEAKERS **Pavel KABAT**, Director-General and CEO of the International Institute for Applied Systems Analysis (IIASA)

MU Rongping, Director-General of the Center for Innovation and Development, Chinese Academy of Sciences

Daya REDDY, President of the Academy of Science of South Africa, President-elect of the International Council for Science (ICSU)

RAPPORTEUR **Sergio Jorge PASTRANA**, Foreign Secretary and Executive Director of the Academy of Science of Cuba

MANSHOLT

Parallel 4.3 › Shifting frontiers of science diplomacy

CHAIR **Romain MURENZI**, UNESCO Director for Science Policy and Capacity Building

SPEAKERS **Robin GRIMES**, Chief Scientific Adviser to the UK Foreign and Commonwealth Office

Shaukat HAMEED KHAN, Coordinator-General of the Ministerial Standing Committee on Scientific and Technological Cooperation of the Organization of Islamic Cooperation (COMSTECH)

Maria Cristina RUSSO, Director for International Cooperation, DG Research and Innovation, European Commission

RAPPORTEUR **Kari RAIVIO**, Past President of the Finnish Academy of Sciences and Letters

13:00-14:00 Lunch

14:00-15:00 **Plenary session VI: Taking Stock 2** GASPERI

CHAIR **Oladoyin ODUBANJO**, Executive Secretary of the Nigerian Academy of Science

SPEAKERS Rapporteurs of the parallel sessions III and IV:

3.1 **Peter GRIFFIN**
3.2 **Sofie VANTHOURNOUT**
3.3 **Martin KOWARSCH**

4.1 **Lauri HETEMÄKI**
4.2 **Sergio Jorge PASTRANA**
4.3 **Kari RAIVIO**

15:00-16:20 **Plenary session VII: Strengthening the use of science advice in policy** GASPERI

In many parts of the world we continue to see the development of policies that reject expert advice or bluntly distort the facts. The concluding session of the conference will discuss how to strengthen evidence-based policy in such a climate, e.g. by developing agreed principles to underpin science advice. In particular, the session will discuss the contributions the European Commission, INGSA, the International Council for Science (ICSU) and the scientific community at large can make to this agenda with the aim of claiming the right place for scientific evidence.

CHAIR **James WILSDON**, University of Sheffield, Vice-Chair of the International Network for Government Science Advice (INGSA)

SPEAKERS *Designing principles for scientific advice: Report of the Working Group meeting on Principles and Guidelines for Scientific Advice*
Marc SANER, Institute for Science, Society and Policy, University of Ottawa

Science and policymaking: The view of ICSU
Heide HACKMANN, Executive Director of the International Council for Science (ICSU)

The role of the European Commission in promoting science advice for policymaking
Wolfgang BURTSCHER, Deputy Director-General for Open Innovation, Open Science, Open to the World, Directorate-General for Research and Innovation, European Commission

INGSA - the road ahead
Sir Peter GLUCKMAN, Chair of the International Network for Government Science Advice (INGSA), Chief Science Advisor to the Prime Minister of New Zealand

16:20 Closing of the Conference

PROGRAMME COMMITTEE

Eva ALISIC, Monash University, Immediate Past Co-Chair of the Global Young Academy

Tateo ARIMOTO, Director of the Innovation, Science and Technology Policy Program, National Graduate Institute for Policy Studies (GRIPS)

Sir Peter GLUCKMAN, Chair of the International Network for Government Science Advice (INGSA), Chief Science Advisor to the Prime Minister of New Zealand – Co-Chair

Robin GRIMES, Chief Scientific Adviser to the UK Foreign and Commonwealth Office

Heide HACKMANN, Executive Director of the International Council for Science (ICSU)

Theodoros KARAPIPERIS, Head of Scientific Foresight Unit (STOA), European Parliamentary Research Service (EPRS), European Parliament

Johannes KLUMPERS, Head of Scientific Advice Mechanism Unit, DG Research and Innovation, European Commission – Co-Chair

Martin KOWARSCH, Mercator Research Institute on Global Commons and Climate Change

David MAIR, Head of Geographic Coordination Unit, Joint Research Centre of the European Commission

Rémi QUIRION, Chief Scientist of Québec

Flavia SCHLEGEL, UNESCO Assistant Director-General for the Natural Sciences

Henrik C. WEGENER, Executive Vice-President of the Technical University of Denmark, Chair of the European Commission's High-Level Group of Scientific Advisors

James WILSDON, University of Sheffield, Vice-Chair of the International Network for Government Science Advice (INGSA)

ZAKRI Abdul Hamid, Science Advisor to the Prime Minister of Malaysia and Chair of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)

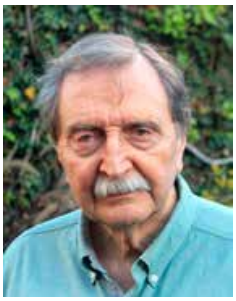
ORGANISING TEAM

EUROPEAN COMMISSION, SCIENTIFIC ADVICE MECHANISM (SAM)

Vera FEHNLE
Corinne GILS
Gerjon IKINK (Trainee)
Jan Marco MÜLLER
Sigrid WEILAND (Leader of EC team)

International Network for Government Science Advice (INGSA)

Kristiann ALLEN
Lara COWEN



Carlos ABELEDO

Director of the Graduate Program in Science and Technology Policy, University of Buenos Aires

Carlos Abeledo is currently Professor of Science Policy and Director of the Graduate Program in Science and Technology Policy at the University of Buenos Aires. He obtained a degree in physical chemistry at the University of Buenos Aires in 1957 and a Ph.D. in Chemical Physics at Northwestern University 1961. From 1961 to 1976 he has been a faculty member at the University of Buenos Aires, University of Chile and Brandeis University. Between 1984 and 1989 he was president of CONICET, the Argentinian National Council of Scientific and Technological Research. From 1991 to 1997 he was a science and technology specialist at the Inter-American Development Bank. He has been a member of the United Nations Advisory Council for Science and Technology for Development and a member of the Executive Council of the "Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (CYTED)".

Eva ALISIC

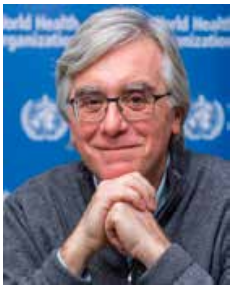
Monash University, Immediate Past Co-Chair of the Global Young Academy

Eva Alisic is a Senior Research Fellow at Monash University, Australia, where she leads the Trauma Recovery Lab. Her background includes both psychology and human resource studies, and she is currently a visiting scholar at the University Children's Hospital Zurich, Switzerland. Dr Alisic's team studies how children, young people, and families cope with traumatic experiences, and how professionals can support them. The consequences of fatal domestic violence, serious injury, war, and disaster are focal points in this research. Eva Alisic is Immediate Past Co-Chair of the Global Young Academy. She was the driving force behind 'Fresh Eyes on the Refugee Crisis', a project which underscored the importance of both academic engagement and open access of the literature on migration and refugees.

Tateo ARIMOTO

Director of the Innovation, Science and Technology Policy Program, National Graduate Institute for Policy Studies (GRIPS)

Tateo Arimoto is currently Professor and Director, Science, Technology and Innovation Policy Program at the National Graduate Institute for Policy Studies (GRIPS) and also Principal Fellow at Japan Science and Technology Agency (JST). He previously served as Director General of the Science & Technology Policy Bureau of the Ministry of Education and Science. He has played an active role in public policy making and implementation in the area of science, technology and innovation in Japan. He has been co-chair of the OECD study project on scientific advice.



Roberto BERTOLLINI

Former WHO Chief Scientist and WHO Representative to the EU

From October 2011 until June 2016, Roberto Bertollini, M.D., M.P.H. has been WHO Representative to the EU in Brussels and Chief Scientist of the WHO Regional Office for Europe. Before this assignment, he has occupied senior management positions in WHO both at the Regional Office for Europe and at the Headquarters in Geneva. Presently he is Richard von Weizsäcker Fellow at the Robert Bosch Academy, Germany, and visiting professor for public health and environmental health at the University of Lisbon and at the Mount Sinai Icahn School of Medicine, USA. Earlier in his career he worked at the Epidemiology Unit of the Lazio Region of Italy and supported health cooperation projects in several European and African countries. Dr Bertollini holds a degree in medicine and a postgraduate degree in paediatrics, as well as a Master in Public Health which he obtained from Johns Hopkins University.

Sixtine BOUYGUES

Deputy Director-General of DG Communication, European Commission

For over a decade, Sixtine developed her communication expertise as Head of the European Commission Representation in Paris and Head of Communication at the Directorate-General for Information Society and Media. Between 2010 and 2015, she shaped the Commission's corporate communications strategy as Director in DG Communication. In December 2015 she was appointed as Deputy Director-General, overseeing the activities of the Commission's Representations in the Member States and citizens' communication.

Wolfgang BURTSCHER

Deputy Director-General for Open Innovation, Open Science, Open to the World, Directorate-General for Research and Innovation, European Commission

Wolfgang Burtscher is Deputy Director-General of the European Commission's Directorate-General for Research and Innovation, responsible for Open Innovation, Open Science, Open to the World. An Austrian national, Wolfgang Burtscher was a Director in DG Agriculture before joining DG Research and Innovation. Before his Commission career, Mr Burtscher worked at the Austrian Permanent Representation to the EU and as Director of European Affairs in the Vorarlberg administration. 1990-1992 he was a legal advisor at the European Free Trade Association (EFTA) in Geneva. 1983-1990 he was a lecturer in International and European Law at the University of Innsbruck. Wolfgang Burtscher holds a doctorate in law and has a qualification from the Institut Européen des Hautes Etudes Internationales in Nice.

Sir Philip CAMPBELL

Editor-in-Chief of Nature and Nature publications

Sir Philip Campbell is Editor-in-Chief of Nature and of Nature publications. His areas of responsibility include the editorial content of Nature, and assuring the long-term quality of all Nature publications. He has a B.Sc. in aeronautical engineering, an M.Sc. in astrophysics and a Ph.D. and postdoctoral research in upper atmospheric physics. Following his research, he became the Physical Sciences Editor of Nature and then, in 1988, the founding editor of Physics World until his return to Nature in 1995. He is a Fellow of the Royal Astronomical Society and a Fellow of the Institute of Physics, and was awarded an honorary D.Sc. by Leicester University and Bristol University, and an Honorary Professorship by the Peking Union Medical College.

Thierry COURVOISIER

President-elect of the European Academies Science Advisory Council EASAC

Thierry J.-L. Courvoisier studied theoretical physics at the Swiss Federal Institute of Technology (ETHZ) and obtained a PhD at the University of Zurich in 1980. He was a scientist in the European Space Agency's X-ray astronomy project EXOSAT and worked at the Space Telescope European Coordinating Facility at the European Southern Observatory ESO in Garching (Germany). He joined the University of Geneva in 1988 where he became professor in 1992 and full professor in 1999. Thierry Courvoisier is president of the European Astronomical Society (EAS) since 2010. He became president of the Swiss Academy of Natural Sciences (SCNAT) 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 vice president of the European Academies Science Advisory Council (EASAC) and was elected to become its president for the period 2017-2019.

Claire CRAIG

Director of Science Policy, Royal Society

Dr Claire Craig CBE is Director of Science Policy at the Royal Society. Previously Claire led the Government Office for Science on behalf of the UK Government's Chief Scientific Advisor (GCSA). She originally joined the Civil Service to run Foresight, a programme of science-based strategic futures projects covering topics from flood risk to cognitive enhancement. Claire has worked extensively on strategy and science in decision making. Her career includes periods at McKinsey & Co and at the Confederation of British Industry. She helped launch a hands-on science centre in her home town (Bristol), and has held non-executive Board roles in a variety of research and teaching institutions including King's College London and Newnham College Cambridge. She trained originally as a geophysicist.

Marta CYGAN

Director for Strategy and General Affairs, Directorate-General for Migration and Home Affairs, European Commission

Marta Cygan is currently Director for Strategy and General Affairs in the European Commission's Directorate-General for Migration and Home Affairs. In the years 2009-2013 she was Director for Immigration in the same Directorate. Between 2004 and 2009 she was Deputy Head of Cabinet of the European Commissioner responsible for Regional Policy, Danuta Huebner. Between 1996 and 2004 she served as First Counsellor in the Polish Mission in Brussels, then Polish Permanent Representation to the European Union. In 1993 she joined the Polish Ministry of Foreign Affairs, where she worked as Head of the European Law Section in the Legal and Treaties Department. Born in Krakow and of Polish nationality, she graduated in Law and Languages from Jagiellonian University in Krakow. She obtained a Diploma in Community Law by the College of Europe in Bruges and in European law and policies by the European College in Parma.

Jos DELBEKE

Director-General for Climate Action, European Commission

Jos Delbeke has been the Director-General of the European Commission's Directorate-General for Climate Action since its creation in 2010. He joined the European Commission in 1986. He has been a key player in developing EU legislation on cars and fuels, the Emissions Trading System, air quality, emissions from big industrial installations and chemicals (REACH). He has been responsible for developing the EU's international climate change strategy and was for many years the European Commission's chief negotiator at the United Nations climate conferences. Mr Delbeke holds a Ph.D. in economics (1986, Louvain, Belgium) and worked in 1985 at the International Monetary Fund (Washington DC, USA). He has been a lecturer at the University of Louvain on European and international environmental policy since 2013.

Hubert DELUYKER

Scientific Adviser to the Executive Director, European Food Safety Authority (EFSA)

Hubert Deluyker is EFSA's Scientific Adviser, providing the Executive Director with advice on issues related to EFSA's scientific activities. He joined EFSA in 2004 and established and was acting Head of EFSA's Assessment Methodology Unit. Afterwards he developed and became the Director of EFSA's former Scientific Co-operation and Assistance Directorate from 2007 to 2011, when he was appointed Director of Science Strategy and Coordination, a post he held until May 2013. Before working for EFSA he was a clinical research scientist in the field of animal health from 1989 to 2004 for Pfizer Belgium. He was also Associate Professor in Epidemiology from 1991 to 2000 at the School of Veterinary Medicine of the University of Ghent, Belgium. He previously worked as District Veterinary Officer for the Belgian Ministry of Agriculture.

Mady DELVAUX-STEHRES

Member of the European Parliament, former Minister for Education of Luxembourg

Mady Delvaux studied classical literature in Paris and became a teacher of Latin and French in the city of Luxembourg. She has been a member of the Luxembourg Socialist Workers' Party since 1974 and in 1987 became a member of the city council of Luxembourg. She gave up her teaching post in 1989 when she entered government as secretary of State for Health, Social Security, Youth, and Sport. She was Minister of Social Security, Transport and Communication of Luxembourg 1994-1999, a Member of the Luxembourg Parliament 1999-2004, and Minister for Education 2004-2013. Since 2014 she is a Member of the European Parliament.

Heather DOUGLAS

Waterloo Chair in Science and Society, University of Waterloo

Heather Douglas is the Waterloo Chair in Science and Society and Associate Professor in the Department of Philosophy at the University of Waterloo, Ontario, Canada. She received her Ph.D. from the History and Philosophy of Science Department at the University of Pittsburgh in 1998. She is the author of *Science, Policy, and the Value-Free Ideal* (University of Pittsburgh Press, 2009) as well as numerous articles. Her work focuses on the role of values in science, science policy, and science in democratic societies. She is a Fellow of the Institute for Science, Society, and Policy at the University of Ottawa and a Professor of the Balsillie School of International Affairs, where she convenes the Science & Health Policy Research Cluster. She is also an Associate Director for the Waterloo Institute for Sustainable Energy.

Pearl DYKSTRA

Erasmus University of Rotterdam, Member of the European Commission's High-Level Group of Scientific Advisors

Pearl Dykstra has a chair in Empirical Sociology and is Director of Research of the Department of Public Administration and Sociology at the Erasmus University of Rotterdam. Previously, she had a chair in Kinship Demography at Utrecht University (2002-2009) and was a senior scientist at the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague (1990-2009). Her publications focus on intergenerational solidarity, aging societies, family change, aging and the life course, and late-life well-being. She is an elected member of the Netherlands Royal Academy of Arts and Sciences and served as vice-president of the Academy 2011-2016. She was appointed in 2015 as member of the High Level Group of scientists who advise the College of European Commissioners.

Ene ERGMA

Former Speaker of the Parliament of Estonia

Ene Ergma was born in 1944 in Rakvere, Estonia. She attended the University of Moscow. She received a Ph.D. equivalent from the University in 1972 and a senior research doctorate from the Space Research Institute in Moscow in 1984. After receiving her Ph.D. she joined the Astronomical Council AS USSR, and returned to Estonia in 1988 to take the astrophysics chair at Tartu University. In 1977 she was elected to be a member of the Estonian Academy of Sciences and 1999-2003 she was vice-president of the Academy. Ene Ergma served as chairwoman of the Estonian Science Foundation Council (1998-2003), Adviser of the European Commission's "Science and Society" Committee, as well as chairwoman of the ENWISE (Enlarge Women in Science to East) expert group. 2002-2005 she was a Descartes Prize Grand Jury member, including as president of the jury (2003-2005). She served 2003-2014 as Member of the Parliament of Estonia, 2003-2006 as Speaker, 2006-2007 as Vice-Speaker, and again 2007-2014 as Speaker of the Parliament.

Ulrike FELT

Dean of the Faculty of Social Sciences, University of Vienna

Ulrike Felt is Professor of Science and Technology Studies, Dean of the Faculty of Social Sciences and currently head of the interdisciplinary research platform "Responsible Research and Innovation in Academic Practice" at the University of Vienna. She holds a Ph.D. in physics/mathematics and a habilitation in the social sciences. Her research focuses on the issues of technoscience, democracy and public engagement, changing research cultures, and responsible research. She has been guest professor at numerous universities and has been involved in policy advice on European and national levels. Until 2007 she was editor-in-chief of the SAGE Journal *Science, Technology, & Human Values*.

Mark FERGUSON

Chief Scientific Adviser to the Government of Ireland and Director General of Science Foundation Ireland

Professor Mark W.J. Ferguson commenced as Director General of Science Foundation Ireland and as Chief Scientific Adviser to the Government of Ireland in 2012. Previously he was Professor in Life Sciences at the University of Manchester (since 1984) and co-founder, CEO and Chairman of Renovo Group plc (1998-2011). Mark graduated from the Queens University of Belfast with degrees in Dentistry, Anatomy and Embryology, and Medical Sciences. He holds Fellowships from the Royal Colleges of Surgeons in Ireland (FFD), and Edinburgh (FDS) and is a Founding Fellow of the UK Academy of Medical Sciences (FMedSci). He is a member or fellow of a number of learned societies, and was made a "Commander of the British Empire" (CBE) by the Queen in 1999.

Alan FINKEL

Australia's Chief Scientist

Alan Finkel commenced as Australia's Chief Scientist on 25 January 2016. Prior to this, he was the Chancellor of Monash University and President of the Australian Academy of Technology and Engineering (ATSE). Dr Finkel was awarded his PhD in electrical engineering from Monash University and worked as a postdoctoral research fellow in neuroscience at the Australian National University. In 1983 he founded Axon Instruments, a California-based company that made precision scientific instruments. Following his return to Australia in 2006, he led the amalgamation that formed the Florey Neuroscience Institutes; he became Chair of the Australian Centre of Excellence for All-Sky Astrophysics (CAASTRO) and worked in a number of high-level positions in the private sector, including as Chief Technology Officer of Better Place Australia. Dr Finkel also co-founded Cosmos Magazine, which in addition to publishing operates a secondary schools science education program.

Dame Anne GLOVER

Vice-Principal for External Affairs and Dean for Europe, University of Aberdeen

Anne has a B.Sc. in Biochemistry from Edinburgh and a Ph.D. in Molecular Microbiology from Cambridge, UK. Besides her career in scientific research at Aberdeen University she commercialised some of her biosensor technology into a successful company which diagnoses environmental pollution and provides solutions for its clean-up. Anne was the first Chief Scientific Adviser to the President of the European Commission (2012-2015). Prior to that, she was the first Chief Scientific Adviser for Scotland (2006-2011). Anne became a Dame Commander of the Order of the British Empire (DBE) for services to Science in the UK and Europe in 2015 and was elected to the Royal Society in April 2016.

Sir Peter GLUCKMAN

Chair of the International Network for Government Science Advice (INGSA), Chief Science Advisor to the Prime Minister of New Zealand

Professor Sir Peter Gluckman is the Chief Science Advisor to the Prime Minister of New Zealand, a role he has held since the position was established in 2009. He is founder and chair of both the APEC Economies' Chief Scientists' and Equivalents Network (CSAE) and the International Network of Government Science Advice (INGSA). He is also the founding chair of the Small Advanced Economies Initiative (SAEI), which is an intergovernmental forum focused on science policy challenges unique to smaller jurisdictions. He was the founding Director of the Liggins Institute and is one of New Zealand's best known scientists. In 2015, Sir Peter was appointed chair of the WHO's Commission to End Childhood Obesity. In the same year he was invested to the Order of New Zealand, the country's highest honour which is reserved for only 20 living people. His research has won him numerous awards and international recognition including New Zealand's top science award, the Rutherford Medal, as well as being elected as a Fellow of the Royal Society.

Marguerite GRANDJEAN

Director of Studies, OuiShare

Marguerite is a futurist and director of studies. She acts as a foresight expert for DG Research and Innovation at the European Commission. She was previously based in Washington D.C. at the Institute for Alternative Futures, where she conducted numerous foresight projects for partners including Oxfam, MIT, and IEEE. Before that she worked as a futurist at Futuribles in Paris, France. She is also connector at OuiShare, an international network which incubates, connects and raises awareness about multiple social innovation projects. She is currently leading a study on governance models in organizations from the collaborative economy and social and solidarity economy. She is a graduate of ESSEC (Paris, France) and LSE (London, UK) in business, international development and demography.

Peter GRIFFIN

Director of the New Zealand Science Media Centre

Peter Griffin is the founding director of the New Zealand Science Media Centre, one of an international network of not for profits that help scientists work more effectively with the media. The former technology editor for the New Zealand Herald, he is also a columnist for the New Zealand Listener and the founding editor of Australasia's largest science blog network, Sciblogs.co.nz. He has contributed to research projects and government strategies to improve science communication and won the 2012 Fulbright-Harkness Fellowship which allowed him to visit the US to look at centres of excellence for not for profit public interest journalism.

Robin GRIMES

Chief Scientific Adviser to the UK Foreign and Commonwealth Office

Robin Grimes is currently Professor of Materials Physics at Imperial College. His research is focussed on the use of high performance computing techniques to understand the behaviour of materials for energy applications including nuclear fission and fusion, fuel cells, batteries and solar cells. He is also Principal Investigator of the Research Council's UK Nuclear Fission consortium project. Professor Grimes has advised the House of Lords Science and Technology Committee's inquiry into nuclear research requirements, and was part of the Scientific Advisory Group for Emergencies (SAGE) that provided official advice on the 2011 Fukushima disaster. He has considerable experience of high-level international work, including many overseas missions.

Marga GUAL SOLER

Project Director, Center for Science Diplomacy, American Association for the Advancement of Science (AAAS)

Dr Marga Gual Soler is a Project Director at the Center for Science Diplomacy at the American Association for the Advancement of Science (AAAS). She develops the Center's global science diplomacy education and capacity building initiatives and serves as a senior editor of the open access policy journal *Science & Diplomacy*. Marga serves on the Research, Innovation and Science Policy Experts Group (RISE) of the European Commission. As a faculty member at Arizona State University she launched the Science Diplomacy & Leadership Program, a pioneer science diplomacy immersion course in Washington, D.C. She received a Ph.D. in biomedical sciences from the University of Queensland in Australia, a Bachelor's and Master's from the University of Barcelona in Spain, and is an alumna of the prestigious Georgetown University Global Competitiveness Leadership Program.

Heide HACKMANN

Executive Director of the International Council for Science (ICSU)

Heide joined ICSU as Executive Director in March 2015, following eight years as Executive Director of the International Social Science Council. Heide read for a M.Phil. in contemporary social theory at the University of Cambridge, UK, and holds a Ph.D. in science and technology studies from the University of Twente in the Netherlands. She has worked as a science policy maker, researcher and consultant in the Netherlands, Germany, the United Kingdom and South Africa. Before moving into the world of the international councils, Heide worked as Head of the Department of International Relations and Quality Assessment of the Royal Netherlands Academy of Arts and Sciences. Her career in science policy dates back to the early 1990s when she worked at the Human Sciences Research Council in South Africa.

Shaukat HAMEED KHAN

Coordinator-General of the Ministerial Standing Committee on Scientific and Technological Cooperation of the Organization of Islamic Cooperation (COMSTECH)

Dr Shaukat Hameed Khan is currently Coordinator-General of COMSTECH, the Ministerial Standing Committee on Scientific and Technological Cooperation of the Organization for Islamic Cooperation, with its headquarters in Islamabad. He has B.Sc. and D.Phil. degrees from Oxford University and is a Fellow of the Pakistan Academy of Sciences. Dr Hameed Khan served as Rector of the Ghulam Ishaq Khan Institute, Member of the Planning Commission of Pakistan, Chief Scientist of the Pakistan Atomic Energy Commission, visiting scientist at CERN, and has been Member of the highest planning bodies on science policy in Pakistan. He started Pakistan's Laser Programme in 1971 which has grown into the National Institute of Lasers and Optics. His work in policy and strategy formulation resulted inter alia in the establishment of the Higher Education Commission of Pakistan.

Yuko HARAYAMA

Executive Member of the Council for Science and Technology Policy, Cabinet Office of Japan

Dr Yuko Harayama is an Executive Member of the Council for Science and Technology Policy, Cabinet Office of Japan. She is the former Deputy Director of the Directorate for Science, Technology and Innovation of OECD. She is a Legion d'Honneur recipient and was awarded a honorary doctorate from the University of Neuchâtel. She was Professor in the Department of Management Science and Technology at the Graduate School of Engineering of Tohoku University. She holds a Ph.D. in education sciences and a Ph.D. in economics from the University of Geneva.

Jennifer Cassingena HARPER

Consultant, Malta Council for Science and Technology

Jennifer Cassingena Harper has been engaged with the Malta Council for Science and Technology since 1989 in various capacities. Until 2011, she was the Director of Policy, Strategy, FP7 and International with core responsibility for the National Research and Innovation Strategy and Foresight and links with the European Union. She currently retains a part-time consultancy role with the Council. She is a graduate of Keele University, and the London School of Economics. Her doctoral research which focused on the internationalization of S&T Policy was carried out at the University of Malta and Sussex University (SPRU). She lectures in foresight within the University of Malta's Masters Programme in Innovation and Creativity. In Malta, she is a member of the National Commission for Higher and Further Education and Young Enterprise Malta Board of Directors.

HRH Princess Sumaya bint El HASSAN

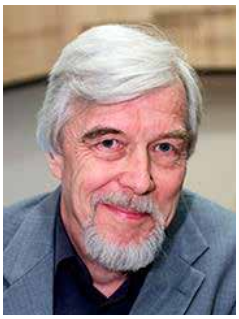
President of the Royal Scientific Society of Jordan, Chair of the World Science Forum 2017

Her Royal Highness Princess Sumaya bint El Hassan is president of the Royal Scientific Society (RSS) and Chair of the Board of Trustees of Princess Sumaya University for Technology (PSUT). The Princess is the Chair of the World Science Forum 2017, which will be held in Jordan. She is also Director and Chair of the National Campaign for Public Awareness of the Drivers of Change, and president of the Board of Governors of the UN ESCWA Technology Center. She is an advocate of science and technology as a catalyst for change in the Arab World, through education, research and innovation. The Princess is an avid archaeologist and is closely involved with the work of the British Institute in Amman for Archaeological Research and the Council for British Research in the Levant. HRH was appointed by HM Queen Rania as Vice Chairman of the Board of Trustees of the first Jordan National Museum, where she is overseeing its development.

Lauri HETEMÄKI

Assistant Director of the European Forest Institute

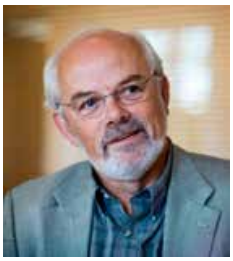
Lauri Hetemäki is the Assistant Director at the European Forest Institute (EFI) and Adjunct Professor at the Faculty of Agriculture and Forestry, University of Helsinki. He has a Ph.D. in economics from the University of Helsinki, and MA in economics from the University of Sussex, England. Hetemäki manages the EFI science-policy work, including the *ThinkForest Forum*, a high-level science-policy forum taking mostly place at the European Parliament. Hetemäki has extensive experience in science-policy support work; e.g. in Finnish Government and Parliament. Before his current position, Hetemäki worked as the Head of Foresight & Information Programme at EFI, and as a part-time Professor in Forest Sector Foresight at the University of Eastern Finland; and as a Senior Researcher and Project Leader at the Finnish Forest Research Institute (Metla).



Rolf-Dieter HEUER

Former Director-General of CERN, Member of the European Commission's High-Level Group of Scientific Advisors

Professor Heuer is an experimental particle physicist who has been Director-General of CERN 2009-2015. His mandate was characterised by the start of the Large Hadron Collider (LHC) in 2009 as well as its energy increase 2015 and the discovery of the H-Boson. He also actively engaged CERN in promoting the importance of science and STEM education. From 2004 to 2008, Prof. Heuer was research director for particle and astroparticle physics at the DESY laboratory, Germany. In April 2016 he became president of the German Physical Society and he is the designated president of the Council of SESAME (Synchrotron-Light for Experimental Science and Applications in the Middle East). Prof. Heuer is Member of several Academies of Sciences and is Honorary Member of the European Physical Society.



Lauritz HOLM-NIELSEN

President of EuroScience

Lauritz Holm-Nielsen is the president of EuroScience, which is the non-profit grassroots association of researchers in Europe, best known for organizing the biennial EuroScience Open Forum (ESOF). Holm-Nielsen was the Rector of Aarhus University from 2005-2013. He is executive director of the Sino-Danish Center (SDC), chairman of the Danish National Nature Fund and member of the Governing Board of Gothenburg University. Inter alia, he was vice-president of the European University Association (EUA), chairman of the Nordic University Association, rector of the Danish Research Academy, and chairman of the Danish Natural Science Research Council. He is Mag.Scient. in botany from Aarhus University and has spent 18 years working abroad, 12 of these as Lead Specialist at the World Bank in Washington D.C. (1993-2005).

Image: Chet Susslin/ National Journal

Rush D. HOLT

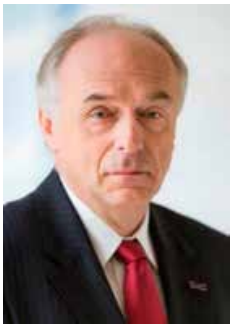
Chief Executive Officer of the American Association for the Advancement of Science (AAAS)

Rush D. Holt, Ph.D., became chief executive officer of the American Association for the Advancement of Science (AAAS) and executive publisher of the *Science* family of journals in February 2015. In this role, Holt leads the world›s largest multi-disciplinary scientific and engineering society. Over his career, Dr Holt has held positions as a teacher, scientist, administrator, and policy maker. From 1987 to 1998, Holt was assistant director of the Princeton Plasma Physics Laboratory (PPPL), which is one of the largest alternative energy research facilities in the country. Holt then served for 16 years as a member of the U.S. House of Representatives, representing New Jersey's 12th Congressional District. Holt holds M.A. and Ph.D. degrees in physics from New York University.

Danuta JAZŁOWIECKA

Member of the European Parliament, Member of the Science and Technology Options Assessment (STOA)

Originally from Opole, Poland, Danuta Jazłowiecka graduated from a scholarship programme at Georgetown University as well as the University of Wisconsin in the United States. She undertook postgraduate studies on International Relations from the Pultusk Academy of Humanities and completed studies in regional politics and structural funding at Luiss University in Rome, a scholarship programme at the Japan International Cooperation Agency in Tokyo, as well as studies at the Danish School of Public Administration. For many years she worked in regional institutions preparing regions for European integration. She represented her home region in the Polish Parliament for two terms, concentrating on European affairs and regional development issues. She has also been in charge of the Polish delegation to the Council of Europe and served as vice-president of the Parliamentary Assembly of the Council of Europe.



Pavel KABAT

Director-General and CEO of the International Institute for Applied Systems Analysis (IIASA)

Pavel Kabat is Director General and Chief Executive Officer of the International Institute for Applied Systems Analysis (IIASA), an independent institute funded by 24 member countries, located near Vienna. He is also Full Professor of Earth System Science at Wageningen University in the Netherlands, Founding Chair of the Dutch Institute for Integrated Research on the Wadden Sea Region, and a Member of the Leadership Council for the United Nations Sustainable Development Solutions Network. Trained as a mathematician and hydrologist, Professor Kabat's almost 30 year research career has covered earth system science and global change, with a specific focus on land-atmosphere interactions, climate hydrology, water cycle and water resources. He contributed as lead author to the assessment reports of the IPCC.

Johannes KLUMPERS

Head of Scientific Advice Mechanism Unit, DG Research and Innovation, European Commission

Johannes Klumpers heads the recently created Scientific Advice Mechanism Unit (SAM) of the European Commission. The unit provides the secretariats for the Commission's High Level Group of Scientific Advisors as well as the European Group on Ethics in Science and New Technologies (EGE), and develops policies on research integrity. A German national, Dr. Klumpers studied forestry and wood technology and obtained his Ph.D. from the French Ecole Nationale du Génie Rural, des Eaux et Forêts (ENGREF). After several years of industrial research in Sweden, he joined the European Commission's Directorate-General for Research & Innovation in 1998 and has worked on a variety of topics, including raw materials, gender equality, science in society, and budget.

Martin KOWARSCH

Mercator Research Institute on Global Commons and Climate Change

Dr Martin Kowarsch is heading the working group "Scientific Assessments, Ethics, and Public Policy" at the Mercator Research Institute on Global Commons and Climate Change (MCC) in Berlin. He is currently leading a joint big research initiative of MCC and the United Nations Environment Programme (UNEP) called "The Future of Global Environmental Assessment Making" (FOGEAM). This effort to evaluate past global assessment making aims to inform future choices for global assessment design. Jointly with Ottmar Edenhofer, Kowarsch developed a refined normative science-policy model called the "Pragmatic-Enlightened Model" (PEM), which suggests exploring alternative policy pathways and their implications jointly with stakeholders. In addition, Kowarsch provided advice for the processes and design of UNEP's GEO-6 assessment and other science-policy interfaces. He studied philosophy and economics.

László LOVÁSZ

President of the Hungarian Academy of Sciences

László Lovász (born in 1948) is a Hungarian mathematician, best known for his work in combinatorics, graph theory and theoretical computer science. He is winner of the Wolf and Kyoto Prize and currently serves as the president of the Hungarian Academy of Sciences. He had been professor at Yale University and collaborative member of the Microsoft Research Center until he returned to Eötvös Loránd University in Budapest in 2006 as director of the Mathematical Institute. He was president of the International Mathematical Union (2007-2010). He is a member of the US National Academy of Sciences and a foreign member of the Royal Netherlands Academy of Arts and Sciences and Royal Swedish Academy of Sciences.

Jacques LUKASIK

*Secretary-General of the European Council of Academies of Applied Sciences, Technologies and Engineering (*Euro-CASE*)*

In 2011, Dr Jacques Lukasik was appointed the Secretary-General of Euro-CASE, which groups academies of engineering from 22 European countries, counting more than 6 000 Fellows. He was educated in Poland, in the USA and in France where he earned his "Doctorat d'Etat" degree. His scientific background is in non-linear optics and lasers and his 18 years long research career was accomplished within the French National Center for Scientific Research (CNRS). In 1986, he joined an industrial company, LAFARGE, a world leader in construction materials with 65,000 employees. Until his retirement at the end of 2009, he held the position of Group Senior Vice President and Chief Scientific Officer. Lukasik is a Fellow of the National Academy of Technologies of France and an associate foreign member of the Civil Engineering Committee of the Polish Academy of Sciences.

David MAIR

Head of Geographic Coordination Unit, Joint Research Centre of the European Commission

David joined the Commission's Joint Research Centre (JRC) in 2011 as Head of Unit responsible for science advice to policy and parts of the JRC Work Programme. Since July 2016 he is responsible for the unit for geographic knowledge management for policy. Prior to his JRC career he worked from 1998 to 2011 in DG Health and Consumers, being involved in policy strategy, enforcement issues and consumer research, data and statistics. From 2007 to 2011 he was Head of Unit for consumer market monitoring and analysis, responsible for the Consumer Markets Scoreboard and work on consumer behaviour. Prior to joining the Commission in 1995 he worked for the UK Treasury in Brussels and London and also worked in the City of London as a corporate financier. He studied History at Cambridge University.

Clare MATTERSON

Director of Strategy, Wellcome Trust

Clare Matterson CBE is Director of Strategy at the Wellcome Trust. Clare leads on strategy, policy, advocacy and education, communicating the work of Wellcome, leading grant management and incubating new initiatives. Clare received a CBE in recognition of her services to public engagement with Science. From 2004 to 2014, Clare was Director of Culture & Society at the Wellcome Trust. With a small team, she conceived and led the first 10 years of Wellcome Collection – the Trust's highly acclaimed public venue. Passionate about education, Clare led the Wellcome Trust's initiative to create the National Science Learning Centre – a partnership with the UK Government to drive improvement in science education. She is currently Chair of the National Forum for Public Engagement with STEM.

Julie MAXTON

Executive Director of the Royal Society

Dr Julie Maxton is the Executive Director of the Royal Society, the first woman in 350 years to hold the post. Before taking up her position at the Royal Society in 2011, Julie was Registrar at the University of Oxford, the first woman in 550 years in the role. She is an Honorary Fellow of University College Oxford, a Bencher of the Middle Temple, a Freeman of the Goldsmith's Company, and a member of several boards, including of Engineering UK and the Charities Aid Foundation. Originally trained as a barrister at the Middle Temple, Julie combined a career as a practising lawyer with that of an academic, holding a number of senior academic positions, including those of Deputy Vice Chancellor, Professor and Dean of the Faculty of Law at the University of Auckland.

Juan MAYR MALDONADO

Former Environment Minister of Colombia and Chair of the UN Conference on Biosafety

Juan Mayr Maldonado has spent his life working to protect biocultural diversity. A professional photographer, he is experienced in both government and non-government sectors and has taken on roles such as Colombian Minister for the Environment (1998-2002) and vice-president of IUCN (1993-1996). He has presided over major conferences and negotiations on environment and sustainable development, including sessions of the UN Commission on Sustainable Development and the Biosafety Protocol negotiations. He has served as advisor to UNDP and member of the National Conciliation Commission, promoting the environment as the key to a sustainable path towards peace and reconciliation in Colombia. He recently served as Colombian Ambassador to Germany (2011-2016), promoting education, science and research in international relations.

Gordon McBEAN

President of the International Council for Science (ICSU)

Gordon McBean is president of the International Council for Science (ICSU), co-chair of the Governing Council for Future Earth, Director for Policy Studies of the Institute for Catastrophic Loss Reduction and member of several international and national committees, including the UNESCO Ad Hoc Expert Group on ethical principles in relation to climate change. He was Professor of Geography at Western University (2000-2015) with joint appointments in Political Science and Physics. From 1994 to 2000, he was Assistant Deputy Minister at Environment Canada, advising the government on international climate issues. Before that he was Professor for Atmospheric-Oceanic Sciences at the University of British Columbia (1988-1994). He has been chair of the World Climate Research Programme (1988-1994) and chair of the Planning/Science Committee of the Integrated Research on Disaster Risk Program (2005-2011), among other assignments.

Marcia McNUTT

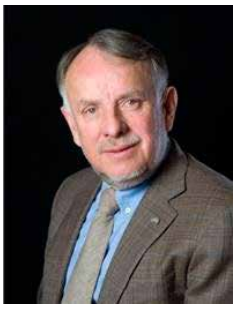
President of the National Academy of Sciences, USA

Marcia McNutt is a geophysicist and president of the National Academy of Sciences. From 2013 to 2016, she served as editor-in-chief of the *Science* journals. Prior to joining *Science*, she was director of the U.S. Geological Survey (USGS) from 2009 to 2013. During her tenure, the USGS responded to a number of major disasters, including the Deepwater Horizon oil spill. Before joining the USGS, McNutt served as president and chief executive officer of the Monterey Bay Aquarium Research Institute (MBARI). McNutt began her academic career at the Massachusetts Institute of Technology (MIT), where she was the E.A. Griswold Professor of Geophysics and directed the Joint Program in Oceanography/ Applied Ocean Science & Engineering, jointly offered by MIT and the Woods Hole Oceanographic Institution. She is a veteran of more than a dozen deep-sea expeditions, on most of which she was chief or co-chief scientist. McNutt received a B.A. in physics from Colorado College and her Ph.D. in earth sciences at the Scripps Institution of Oceanography.

Jos van der MEER

President of the European Academies Science Advisory Council (EASAC)

Jos WM van der Meer is emeritus Professor of Medicine at Radboud University Nijmegen, The Netherlands. Between 1992 and 2012 he was head of the Department of Internal Medicine at the Radboud University Medical Centre. He is a member of the Royal Netherlands Academy of Arts and Sciences (KNAW), for which he served as a vice-president from 2005 to 2011. He is a member of Academia Europaea and is the current president of EASAC, the European Academies Science Advisory Council. Among other assignments, he is a member of the Dutch National Board for Research Integrity and was awarded knighthood in the order of the Netherlands Lion in 2003.



Arturo MENCHACA ROCHA

General Coordinator of the Science Advisory Council of the Presidency of Mexico

Arturo Menchaca Rocha obtained a Physics B.Sc. (1970) from the National Autonomous University of Mexico (UNAM), and a D.Phil. from the University of Oxford (1974), followed by a postdoctoral position at the UC Lawrence Berkeley Laboratory. In 1975 he joined the UNAM Institute of Physics, serving as its director in 2003-2007. His areas of expertise are heavy-ion reaction mechanisms, charged particle detection, and hydrodynamic simulations of nuclear reactions. He and his group contributed to projects aboard the International Space Station and at CERN's Large Hadron Collider. In 2004 he received from the President of Mexico the National Sciences and Arts Prize, the highest academic honour in the country, and became a member of Mexico's Presidential Advisory Council for Science, of which he was elected General Coordinator in January 2016. 2010-2012 he served as President of the Mexican Academy of Sciences.

Ann METTLER

Head of the European Political Strategy Centre (EPSC), European Commission

Ann Mettler is the Head of the European Political Strategy Centre (EPSC), the in-house think tank of the European Commission, which reports directly to President Juncker. In this capacity, she also serves as chair of the European Strategy and Policy Analysis System (ESPAS), an inter-institutional project aimed at strengthening the EU's foresight capacity and anticipatory governance. Prior to assuming this position in December 2014, she was for 11 years executive director of the Lisbon Council, a Brussels-based think tank she co-founded in 2003. From 2000-2003, she worked at the World Economic Forum. Ann holds Masters degrees in political science and European law and economics, and graduated with distinctions from the University of New Mexico, USA, and the University of Bonn, Germany.

Carlos MOEDAS

European Commissioner for Research, Science and Innovation

Carlos Moedas graduated in Civil Engineering from the Higher Technical Institute (IST) in Lisbon in 1993 and completed the final year of studies at the École Nationale des Ponts et Chaussées in Paris. He worked in engineering for the Suez-Lyonnaise des Eaux group in France until 1998. He obtained an MBA from Harvard Business School (USA) in 2000, after which he joined the investment bank Goldman Sachs in London (UK). He returned to Portugal in 2004 as Managing Director of Aguirre Newman and founded in 2008 his own investment company. In 2011, he was elected for the National Parliament and appointed as Secretary of State to the Prime Minister in charge of the Portuguese Adjustment Programme. In 2014, he became European Commissioner for Research, Science and Innovation.

Khotso MOKHELE

Special Advisor to the South African Minister of Science and Technology

Dr Mokhele currently serves as special advisor to the South African Minister of Science and Technology and chancellor of the University of the Free State. He previously served as the founder president of the South African National Research Foundation and as the founder president of the Academy of Science of South Africa. This was preceded by academic positions in the Departments of Microbiology at the Universities of Cape Town and Fort Hare. His international roles included, inter alia, membership of the Executive Board of UNESCO (1997-2001) and Vice-President for Scientific Planning and Review of the International Council for Science ICSU (2005-2008). Dr Mokhele holds a Ph.D. in Microbiology from the University of California and had postdoctoral fellowships at Johns Hopkins University and the University of Pennsylvania.

MU Rongping

Director-General of the Center for Innovation and Development, Chinese Academy of Sciences

Mu Rongping received his B.Sc. in physics (1983) and M.Sc. degree in history of science (1990) from the University of Science and Technology of China, and his Ph.D. degree in history of technology (2002) from the Technical University of Berlin, Germany. Dr. Mu has been director-general of the CAS Center for Innovation and Development since 2007, the director-general of the CAS Center for IPR Research and Training since 2009, and a professor of the CAS Institute of Policy and Management (CASIPM) since 2001, serving as director-general of CASIPM 2004-2014. He is also editor-in-chief of the Journal of Science Research Management (an academic monthly) since 2003. Dr. Mu is the president of the China High-tech Industry Promotion Society (CHIPS) since 2014.

Helen MUNN

Executive Director, Academy of Medical Sciences (UK), Member of the Federation of European Academies of Medicine (FEAM)

Dr Helen Munn is the Executive Director of the UK's Academy of Medical Sciences, which represents the full spectrum of medical science, from basic research through clinical application to healthcare delivery. With its 1200 elected Fellows, the academy is a committed member of the Federation of European Academies of Medicine (FEAM). Helen joined the Academy's policy team in 2004, becoming executive director in 2009. Since then she has overseen a major expansion in the Academy's resources, profile and impact. Prior to joining the Academy, Helen worked at the UK Parliamentary Office for Science & Technology and in the BBC Science Team. She followed her undergraduate degree from The Queen's College, Oxford with a Ph.D. in molecular endocrinology from the University of Edinburgh.

Romain MURENZI

UNESCO Director for Science Policy and Capacity Building

Romain Murenzi took office as director of UNESCO's Division of Science Policy and Capacity Building in June 2016. Since 2011 he had served as executive director of The World Academy of Sciences (TWAS) based in Trieste, Italy. Born in Rwanda, Murenzi holds a B.Sc. degree in Mathematics from the University of Burundi (1982), as well as an M.Sc. (1986) and Ph.D. (1990) in Physics, obtained at the Catholic University of Louvain (Belgium). In 1992, he became a principal investigator at the Clark Atlanta University Center for Theoretical Studies of Physical Systems (USA), being selected chair of the physics department in 1999. He served from 2001 to 2006 as Rwanda's Minister of Education, Science, Technology and Scientific Research, and from 2006 to 2009 as Minister in the President's Office. In 2009, Murenzi joined the American Association for the Advancement of Science (AAAS) where he was named director of the AAAS Center for Science, Technology and Sustainable Development.

Chandrika NATH

Acting Director of the UK Parliamentary Office of Science and Technology

Chandrika Nath is acting director of the UK Parliamentary Office of Science and Technology, an internal office of both Houses of the UK Parliament whose remit is to provide parliamentarians with objective scientific advice. Dr Nath has almost 14 years of experience of providing scientific advice to Parliamentarians. She has a keen interest in international development issues and has worked with countries such as Uganda, Kenya and Nigeria to support evidence informed policy making in a Parliamentary context. Prior to working for Parliament she worked at the British Antarctic Survey as a glaciologist. She has a doctorate in particle physics from Oxford University.

Tibor NAVRACSICS

European Commissioner for Education, Culture, Youth and Sport

Tibor Navracsics holds degrees in law from the Faculty of Law and Political Sciences of Budapest's ELTE University and a Ph.D. in political sciences. In 1999 he became an Associate professor at the Faculty of Law and Political Sciences at ELTE. In 1997 he assumed the position of the secretary-general of the Hungarian Political Science Association and was head of the Prime Minister's Office until 2002. In 2003 he became chef de cabinet to the president of the Hungarian Civic Union Fidesz. 2006–2010 he was an elected Member of the Hungarian Parliament. Between 2010 and 2014 he served as Deputy Prime Minister of Hungary and Minister of Public Administration and Justice. In 2014 he also assumed the position of Minister of Foreign Affairs and Trade. In November 2014, Tibor Navracsics became European Commissioner for Education, Culture, Youth and Sport.

Linda NORDLING

Freelance Journalist

Linda Nordling is a journalist and editor based in Cape Town, South Africa. She specialises in reporting on African science policy and funding. She is the managing editor of *Research Africa*, an online funding news service for African researchers. She also contributes news and features on African science to a variety of international publications, including *Nature* and *The Guardian*. For nearly eight years she penned the monthly 'Africa Analysis' column on the website SciDev.net. She has mentored many African science journalists. She is originally from Sweden and trained and worked in the UK before moving to South Africa in 2006. She has a special interest in how African research is portrayed globally as well as in equitable research partnerships between developed and developing countries.

Connie NSHEMEREIRWE

Uganda Martyrs University, Member of the Global Young Academy

Dr. Connie Nshemereirwe is a Senior Lecturer at Uganda Martyrs University, with a dual appointment in the Faculty of the Built Environment and the Faculty of Education. She finds herself caught between the two worlds as a result of her background in Civil Engineering, although she is at the end of a career shift to education "proper". To make the transition, she completed a master's degree in the design of education and training systems at the University of Twente in 2004, which was later followed by a PhD in Educational Measurement at the same University in 2014. Her teaching and research work revolves around the integration of academic and life skills within university education.

Oladoyin ODUBANJO

Executive Secretary of the Nigerian Academy of Science

Oladoyin Odubanjo is the executive secretary of the Nigerian Academy of Science. He is also the chairman of the Association of Public Health Physicians of Nigeria (Lagos Chapter) and was recently appointed member of the steering committee for Africa of the International Network for Government Science Advice (INGSA). Before working for the Nigerian Academy of Sciences, Dr Odubanjo worked as a physician for the Nigerian government, including heading a government hospital with additional supervision of two primary health care facilities. Dr Odubanjo was instrumental to a successful transition of the Nigerian Academy of Science from a largely honorific organization to one that provides evidence-informed advice to government and other stakeholders. In the last eight years, he has collaborated with various African academies and the Network of African Science Academies (NASAC) on diverse projects aimed at informing policy.

Satoru OHTAKE

Senior Fellow at the Economic and Social Research Institute of the Cabinet Office of Japan

Satoru Ohtake joined the science and technology administration in the Government of Japan in 1984, just after graduating from the University of Tokyo where he was conferred an M.Sc. in high energy physics. He joined the International Human Frontier Science Program in Strasbourg 1990-1992 and supported multilateral initiatives such as the Global Science Forum of the OECD, the Group of Earth Observation (GEO) and the International Thermonuclear Experimental Reactor project (ITER). Mr Ohtake worked for the Japan Aerospace Exploration Agency (JAXA), the National Institute of Radiological Sciences and the Japan Science and Technology Agency (JST), serving as deputy to the JST president and Senior Executive Director. In 2016, he was appointed as an Executive Research Fellow in the Economic and Social Research Institute of the Cabinet Office.

Tolu ONI

University of Cape Town, Co-Chair of the South African Young Academy of Science

Tolu Oni is a Senior Lecturer at the School of Public Health and Family Medicine, University of Cape Town, South Africa. As a Public Health Medical Specialist and Urban Epidemiologist, she is a passionate advocate of health equity. Her research focuses on understanding the interaction between commonly co-occurring chronic conditions, upstream health determinants, the unplanned urban environment, and the impact on health outcomes. She has received several awards, including being selected as a Next Einstein Forum Fellow and a World Economic Forum Young Scientist. As a member and co-chair of the South African Young Academy of Science, and member of the Global Young Academy, she works actively to encourage public engagement to translate research findings into policy and practice.

Sergio Jorge PASTRANA

Foreign Secretary and Executive Director of the Academy of Science of Cuba

Sergio Jorge Pastrana is currently the Foreign Secretary of the Academy of Sciences of Cuba and executive director of the institution. He was president of the Caribbean Scientific Union – the organization that brings together all the Academies of Sciences of the Caribbean region – from 2005 to 2007. A historian and philologist graduated at the University of Havana, he took post graduate studies at the Institute of International Relations of Cuba. Since 2003, Pastrana has been the Cuban representative to the Executive Committee of the Inter Academy Partnership (IAP), the global academy network. He was a member of the Executive Board of the International Council for Science (ICSU) 2005-2014 and ICSU Vice-President 2012-2014.

Melanie PETERS

Director of the Rathenau Institute

In 2015, Dr Melanie Peters became director of the Rathenau Institute, which provides advice to the Dutch government. She studied food technology at Wageningen University, and became a certified toxicologist. At Imperial College, London, she received a Ph.D. in biochemistry. Dr Peters worked as a scientific researcher at the University of Texas at Austin, and led a research team at the Shell Research and Technology Centre Amsterdam. She has held various positions combining science, policy, politics and social issues, inter alia at the Ministry of Agriculture, the Dutch Consumer Association, and as director of Utrecht University's Studium Generale scientific discussion platform.

Aurélie PONTHIEU

Humanitarian Specialist on Displacement, Médecins Sans Frontières

Aurélie Ponthieu has been working for MSF since 2006. She has been working as Humanitarian Specialist for Médecins sans Frontières in Brussels since 2011. Her area of expertise includes forced migration and the humanitarian impact of asylum and migration policies. She provides support to MSF operations in terms of context analysis, positioning and advocacy strategies. She has a Master degree in Humanitarian Action/International Field legal assistance and an LLM in International and European Law. Before working at the MSF Headquarters, she worked in the field with MSF for 5 years in Niger, Sudan, Chad, Colombia, and Haiti. She also worked in Liberia during the Ebola outbreak 2014.

Martin PORTER

Executive Director Industrial Innovation and EU Affairs, European Climate Foundation (ECF)

Dr. Martin Porter is Executive Director Industrial Innovation and EU Affairs of the European Climate Foundation and a member of its Executive Management Team. Also, Martin heads the i24c initiative, which works in partnership with business, political and civil society leaders to play a thought-leadership role on how Europe can best secure competitive advantage in the transition to a new economy. Martin brings two decades of extensive experience in EU affairs and consulting to the ECF. He is a co-founder of Brussels' first "think-do tank", The Centre, a Senior Associate for the Cambridge Programme for Sustainability Leadership and joins ECF from Edelman, where he was Chair of the European Public Affairs Practice and General Manager of the Brussels office.

Xavier PRATS MONNÉ

Director-General for Health and Food Safety, European Commission

Xavier Prats Monné is the Director-General for Health and Food Safety of the European Commission since September 2015. He is responsible for EU policies and programmes in health and food safety, including the promotion of public health, the assessment of national healthcare systems' performance, pharmaceutical legislation, animal health and welfare, but also the handling of crisis situations in human health and the food sector. He previously served as Director-General for Education and Culture, responsible for the Erasmus+ and Marie Curie programmes and representing the Commission on the Governing Board of the European Institute of Innovation and Technology (EIT). From 2007 to 2010, he was director for employment policy and one of the five founding members of the Impact Assessment Board, reporting to the President of the Commission. He holds degrees in Social Anthropology from the Universidad Complutense (Madrid); in Development Cooperation from the International Centre for Advanced Mediterranean Agronomic Studies CIHEAM (Paris); and in European Studies from the College of Europe (Bruges).

Patrice QUESADA

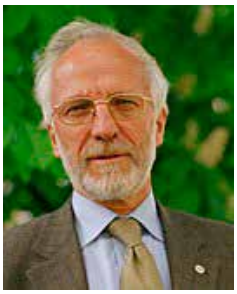
Senior Emergency and Post Crisis Specialist, International Organization for Migration (IOM)

Mr Patrice Quesada is working for the International Organization for Migration (IOM) as a Policy Officer on a number of policies, in particular on migration, environment and climate change. He has contributed to developing and promoting the Organization's vision on the incidence of climate change on human mobility. From policy to operation, Mr Quesada is also working for the IOM Emergency and Post-Crisis division where he coordinates institutional efforts to build on concrete expertise in humanitarian response to natural disasters, from preparedness to recovery. Mr Quesada holds a Master in Philosophy and post-graduate in international relations as well as a degree in business administration. Previously, he has worked for the Organisation for Security and Cooperation in Europe, in Copenhagen, Vienna and in Kosovo as a senior political officer.

Rémi QUIRION

Chief Scientist of Québec

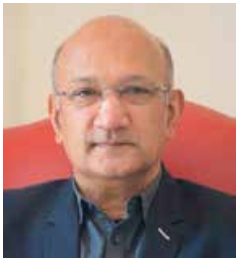
Professor Rémi Quirion is the inaugural Chief Scientist of Québec since July 1st, 2011. He is a Full Professor for Psychiatry at McGill University and outgoing Scientific Director at the Douglas Mental Health University Institute. He served as Vice-Dean of the Faculty of Medicine at McGill, in addition to being the CIHR Executive Director for Alzheimer's Diseases, from 2009 to 2011. Under his leadership, the Douglas Research Centre became a premier research facility in Canada in the fields of neurosciences and mental health. Before that he was the inaugural Scientific Director of the Institute of Neurosciences, Mental Health and Addiction (INMHA) until 2009. He received many awards and recognitions, including being appointed as Fellow of the Canadian Academy of Health Sciences and becoming a Member of the Order of Canada.



Kari RAIVIO

Past President of the Finnish Academy of Sciences and Letters

Kari Raivio studied medicine at the University of Helsinki and got his M.D. in 1965 and Ph.D. in 1969. He spent three years as a Postdoctoral Fellow at the University of California, San Diego. He was Professor of Perinatal Medicine and Head of the Neonatal Intensive Care Unit of the Helsinki University Central Hospital until 1996, when he was elected Rector of the University of Helsinki. After seven years as Rector he became Chancellor of the University of Helsinki for five years until retirement. Dr Raivio has served as president of the European Association of Perinatal Medicine and of the European Society for Pediatric Research, chair of the League of European Research Universities (LERU), and president of the National Academy of Sciences and Letters of Finland. He was Vice-President for Scientific Planning and Review of the International Council for Science (ICSU) and is currently a member of the Engagement Committee of Future Earth.



Daya REDDY

President of the Academy of Science of South Africa, President-elect of the International Council for Science (ICSU)

Daya Reddy obtained a B.Sc. degree in civil engineering from the University of Cape Town, and a Ph.D. degree from Cambridge University. He was appointed professor of applied mathematics at the University of Cape Town in 1989, and served as dean of its science faculty over the period 1999-2005. He currently holds the South African Research Chair in Computational Mechanics. Daya Reddy is President of the Academy of Science of South Africa and serves as co-chair of IAP-Research, a component of the InterAcademy Partnership. He is president-elect of the International Council for Science (ICSU). He is a recipient of the Order of Mapungubwe, awarded by the President of South Africa for distinguished contributions to science.

Maria Cristina RUSSO

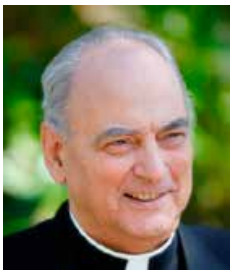
Director for International Cooperation, DG Research and Innovation, European Commission

Maria Cristina Russo was appointed Director for International Cooperation in DG Research and Innovation on the 1st July 2013. From 2010-2013 she served in DG Health and Consumer Affairs as the Head of Unit for "Financial Services and Redress". During 2004-2010 she served within the Secretariat-General of the Commission as a Head of Unit, where she was responsible for the units in charge of "Relations with the Council-Coreper I", "Co-decision" and "Strategic Objective Security and Justice". From 1999-2004 she served as a member of the Cabinet of Philippe Busquin, Commissioner for Research, following postings in the Secretariat-General and DG External Relations. Maria Cristina studied Political Sciences at the Luiss University of Rome and has a Master's Degree in European Studies and a Research Master's from the College of Europe in Bruges.

Maive RUTE

Deputy Director-General of the Joint Research Centre (JRC), European Commission

Maive Rute joined the European Commission in 2005 to become Director for the Promotion of SMEs and Entrepreneurship in DG Enterprise and Industry. She brought in her extensive management experience in the Estonian private and semi-public sector, notably as CEO of KredEx, the funding body for businesses, innovation, housing and export. In the Commission, Ms Rute also worked as Director for Biotechnologies and Agriculture Research and as Resource Director in DG Research and Innovation. Ms Rute graduated as an economist from the Estonian University of Life Sciences. She holds an MBA from the Danube University, Austria, and received an MA in international politics from CERIS, Brussels.



Marcelo SÁNCHEZ SORONDO

Chancellor of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences

Marcelo Sánchez Sorondo was born in Buenos Aires and was ordained a priest in 1968. He was lecturer in the history of philosophy at the Lateran University in Rome where he became full professor. He was dean of the Faculty of Philosophy at the same university and full professor of the history of philosophy at the Libera Università Maria SS. Assunta, Rome. In 1998 he was appointed chancellor of the Pontifical Academies of Sciences and Social Sciences by St John Paul II, who then consecrated him titular Bishop of Vescovìo. His awards include, among others, Cavaliere di Gran Croce (Italy), official of honour of the Légion d'Honneur (France), Grão Mestre da Ordem de Rio Branco (Brazil), Official of the Republic of Austria, Knight of the Republic of Chile, Member of Accademia dei Gergofili, Member of the Accademia Italiana del Vino, Corresponding Member of the Academia de Ciencias de Cuba, Orden del Aguila Azteca (Mexico).

Marc SANER

Institute for Science, Society and Policy, University of Ottawa

Marc Saner is an Associate Professor at the University of Ottawa, Canada (Geography, cross-appointed at the Graduate School of Public and International Affairs and the Institute for Science, Society and Policy). His interests are the science/policy interface, the governance of emerging technologies, and environmental risk, ethics and governance. He recently built the new Institute for Science, Society and Policy at the University of Ottawa. He formerly held managing positions at the Council of Canadian Academies, Carleton University's Regulatory Governance Initiative as well as the independent Institute on Governance. He retains appointments as Adjunct Professor at Carleton University and Fellow at the Balsillie School of International Affairs at Waterloo. Marc Saner holds a doctorate in applied ecology from the University of Basel, Switzerland (1991) as well as a Master in applied ethics from Carleton University, Canada (1999).

Daniel SAREWITZ

Director of the Consortium for Science, Policy and Outcomes, Arizona State University

Daniel Sarewitz is Professor of Science and Society, and co-director and co-founder of the Consortium for Science, Policy, and Outcomes (CSPO) at Arizona State University. He is the editor of the magazine *Issues in Science and Technology* and a regular columnist for *Nature*. His most recent book is The Techno-Human Condition (co-authored with Braden Allenby; MIT Press). From 1989-1993 he worked on R&D policy issues for the U.S. House of Representatives Committee on Science, Space, and Technology. Along with the writer Lee Gutkind, he has recently started up a new project on science and religion.

Yasushi SATO

Centre for Research and Development Strategy, Japan Science and Technology Agency

Yasushi Sato is a Fellow at the Centre for Research and Development Strategy of the Japan Science and Technology Agency. He is a historian of science and technology, focusing on the post-World War II period. His historical research has centred on the complex interaction between science/technology and politics/policy in the United States and Japan. He also conducts research on issues related to science and technology policy, in particular R&D funding and scientific advice. He was an expert member of the OECD Global Science Forum project on scientific advice for policy making (2013-2015). He previously taught at the National Graduate Institute for Policy Studies in Tokyo, and worked for the then Science and Technology Agency. He has a Bachelor's degree (Engineering, 1994) from the University of Tokyo and a Ph.D. (History and Sociology of Science, 2005) from the University of Pennsylvania.

Fabiana SCAPOLO

Deputy Head of Foresight, Behavioural Insights & Design for Policy Unit, Joint Research Centre of the European Commission

Fabiana Scapolo works at the European Commission's Joint Research Centre (JRC) in Brussels. She is Deputy Head of the Foresight, Behavioural Insights & Design for Policy Unit, which is responsible for the EU Policy Lab which explores, connects and finds solutions for better policies by making sense of emerging trends and envisaging alternative futures, better understanding individual and group behaviours, and engaging, co-developing, prototyping and testing new solutions for policy making. Fabiana has more than 15-year of working experience on foresight both in terms of applying foresight to specific contexts and topics as well as advancing the application of foresight methods and tools in policy making. Fabiana's background is in Political Sciences (University of Milan) and she has a Ph.D. on foresight methodologies (University of Manchester).

Flavia SCHLEGEL

UNESCO Assistant Director-General for the Natural Sciences

Flavia Schlegel took up her duties as Assistant Director-General for the Natural Sciences at UNESCO on 1 October 2014. As of 2008 she was Vice-Consul General of Switzerland based in Shanghai, where she was responsible for overseeing the establishment of Swissnex in China, a transdisciplinary institute for science, technology, innovation and culture. She also served as science counsellor for the United States and Canada in the Embassy of Switzerland in Washington D.C. and as vice-director and member of the executive board of the Swiss Federal Office of Public Health. She is the holder of a Medical Doctorate and a Master's Degree in Organizational Development.

Ricardo SERRÃO SANTOS

Member of the European Parliament

Ricardo Serrão Santos graduated in 1979 as a Bachelor (Licenciatura) in psychology and behavioral ecology at the Instituto Superior de Psicologia Aplicada (ISPA) in Lisbon. He obtained a Master in 1984 from the University of the Azores and received a Ph.D. in 1992 from the University of Liverpool. Between 1997 and 2012 he was Head of the Department of Oceanography and Fisheries of the University of the Azores and 2011-2014 vice-rector of the university. 2006-2014 he served as president of the Institute of Marine Research of the Azores. He is an elected member of the Lisbon Academy of Sciences since 2009. In 2014 he was elected Member of the European Parliament representing the Azores.

Carthage SMITH

Head of the OECD Global Science Forum Secretariat

Carthage Smith joined the OECD as Head of the Global Science Forum (GSF) Secretariat in June 2014. He is responsible for working with national members to define the overall strategy and priorities for the Forum. This includes policy work on research infrastructures, Open Science, research funding mechanisms and science advisory processes. Carthage was originally trained as a biochemist, with a Ph.D. in neuroscience from Newcastle University (UK). Prior to joining the GSF Secretariat, he was deputy executive director of the International Council for Science (ICSU) for twelve years. In this position he led the strategic development of a number of major science initiatives. Before moving to France, he spent six years at the UK Medical Research Council, where he was Head of International Cooperation.

Robert-Jan SMITS

Director-General for Research and Innovation, European Commission

Robert-Jan Smits is Director-General for Research and Innovation at the European Commission. In this capacity he is responsible for defining and implementing the EU policy and programmes in the field of research and innovation. He was one of the main architects and negotiators of Horizon 2020, the 80 billion Euro programme for science and innovation (2014-2020). Mr Smits has also been instrumental in the development of several policy initiatives in the field of European science and innovation such as the European Research Council (ERC), the European Roadmap for large-scale facilities, Public-Private Partnerships in research, the Innovation Union and the European Research Area (ERA). Mr Smits has degrees from Utrecht University in The Netherlands, Institut Universitaire d'Hautes Etudes Internationales in Switzerland and Fletcher School of Law & Diplomacy in the US.

Sameh SOROR

Helwan University, Co-Chair of the Global Young Academy

Sameh Soror is the Head of the Biochemistry and Molecular Biology Department at the Faculty of Pharmacy of Helwan University and director of the Centre for Scientific Excellence "Helwan Structural Biology Research (HSBR)". He graduated from the Faculty of Pharmacy at Cairo University in 1997 and received his Master degree in genetics from Kaiserslautern University, Germany in 2003, followed by a Ph.D. in genetic engineering in 2007. He worked as postdoctoral researcher at the Free University Brussels and the Flemish Institute for Biotechnology (VIB) from 2008 to 2012. He is co-founder of the Egyptian Young Academy of Sciences (EYAS) and was elected as co-chair of the Global Young Academy 2013-2015. He also served on the board of the Global Council of the IAP Science Education Program.

Vladimír ŠUCHA

Director-General of the Joint Research Centre (JRC), European Commission

Vladimir Šucha is Director-General of the Joint Research Centre of the European Commission, its in-house science and knowledge service. Before joining the JRC, he spent 6 years in the position of Director for Culture and Media in the Directorate-General for Education and Culture of the European Commission. Between 2005 and 2006, he was director of the Slovak Research and Development Agency, the national body responsible for funding research. He was principal advisor for European affairs to the Minister of Education of the Slovak Republic (2004-2005) and worked at the Slovak Representation to the EU as research, education and culture counsellor (2000-2004). In parallel, he has followed an academic and research career, being a full professor in Slovakia and visiting professor/scientist in many countries.

Suad SULAIMAN

Member of the Executive Committee, Sudanese National Academy of Sciences

Suad Sulaiman is professor of parasitology with special training skills in health and environment, scientific research methodology and ethics, research implementation and management, applied field research on neglected diseases, editing of scientific material, and the mentoring and training of researchers and health personnel. She is currently a member of the executive committee and treasurer of the Sudanese National Academy of Sciences, member of the Technical Advisory and Ethical Research committee of the Federal Ministry of Health and a research director at the Sudan Medical Heritage Foundation.

Tina SWIERCZYNSKI

Executive Secretary of the European Climate Research Alliance (ECRA)

Dr Tina Swierczynski has been coordinating the secretariat of the European Climate Research Alliance (ECRA) in Brussels since March 2014. Prior to this she coordinated the Climate Platform, a network of climate-related research institutes and universities in the Berlin-Brandenburg area. She completed her Ph.D. at the German Research Centre for Geosciences GFZ with a thesis about the reconstruction of flood events in the Alps based on lake sediments. Tina Swierczynski studied Geoecology and Earth Sciences at the Universities of Potsdam and Grenoble. During her studies she also worked at the Leibniz Institute for Regional Development and Structural Planning (IRS) in Erkner and the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg.

Image:Slavko Midžor/Pixell

Bernhard URL

Executive Director of the European Food Safety Authority (EFSA)

Dr Bernhard Url was appointed executive director of EFSA in June 2014. He joined EFSA in June 2012 as head of the Risk Assessment and Scientific Assistance Department. Prior to joining the Authority, Dr Url was managing director of the Austrian Agency for Health and Food Safety (AGES). From 2008 to 2012, he served as a member of EFSA's Management Board. During his 10 years at AGES, he was in charge of technical and scientific affairs with a remit that included the timely delivery of risk assessment and risk management services across a wide range of areas. This included ensuring effective risk communications during urgent food safety-related events. Prior to AGES Dr Url spent five years as an Assistant Professor at the Institute of Milk Hygiene and Milk Technology at the University of Veterinary Medicine in Vienna before running a food quality control laboratory from 1993 to 2002. Dr Url graduated from the University of Veterinary Medicine in Vienna in 1987 and became a Doctor of Veterinary Medicine in 1990.

Sofie VANTHOURNOUT

Director of Sense about Science EU

Sofie has been the Director of Sense about Science EU since May 2016. Sense about Science EU is an independent campaigning NGO that monitors the use and abuse of scientific evidence in EU policy, calling for EU citizens, researchers and the European Parliament to scrutinise and share evidence behind European policymaking. Sofie was trained as a botanist and has a background in molecular biology research. Between 2008 and 2016 she managed the international relations of the Royal Belgian Academies. In 2010, she launched the Brussels office of the European Academies Science Advisory Council (EASAC), which she headed for 6 years. In 2014, she temporarily joined the team of Anne Glover, then Chief Scientific Adviser of the European Commission. It was then that she became passionate about public dialogue and where she became convinced that Brussels is in urgent need of a Sense about Science EU.

Dame Helen WALLACE

Member of Academia Europaea and Fellow of the British Academy

Helen Wallace is a political scientist whose research has focused on the politics of European integration. From 2001 to 2006 she was director of the Robert Schuman Centre for Advanced Studies at the European University Institute in Florence. From 2007-2013 she was a Professor in the European Institute at the London School of Economics and Political Science. She held posts at the Sussex European Institute, the Royal Institute of International Affairs, and the College of Europe. She was elected a Fellow of the British Academy in 2000 and served as Foreign Secretary as well as an *ex officio* Vice-President of the Academy from 2011 to 2015. She is an Honorary Professor at the University of Sussex and became a Dame in 2011.

Charlotte WATTS

Chief Scientific Adviser at the UK Department for International Development (DFID)

Professor Charlotte Watts was appointed Chief Scientific Adviser at the Department for International Development in October 2015. She is head of the Social and Mathematical Epidemiology Group and founder of the Gender, Violence and Health Centre, in the Department for Global Health and Development at the London School of Hygiene & Tropical Medicine. Originally trained as a mathematician, with further training in epidemiology, economics and social science methods, she has twenty years of experience in international HIV and violence research, addressing in particular violence against women. She is chair of the Expert Working Group to Assess the Global Burden of Inter-Personal Violence. She has served on expert consultations for various UN bodies, and has been on the organising committees of several international AIDS conferences.

Henrik C. WEGENER

Executive Vice-President of the Technical University of Denmark, Chair of the European Commission's High-Level Group of Scientific Advisors

Henrik C. Wegener is Executive Vice-President and Chief Academic Officer at the Technical University of Denmark since 2011. He received his M.Sc. in food science and technology from the University of Copenhagen in 1988, his Ph.D. in microbiology from the same university in 1992, and his Master in Public Administration from Copenhagen Business School in 2005. Henrik C. Wegener has been the director of the National Food Institute at DTU (2006-2011) and before the head of the Department of Epidemiology and Risk Assessment at the National Food and Veterinary Research Institute (2004-2006). From 1994-1999, he was director of the Danish Zoonosis Centre, and from 1999-2004 professor of zoonosis epidemiology at the Danish Veterinary Institute. Since 2015 he serves as the chair of the European Commission's High-level Group of Scientific Advisors.

Erika WIDEGREN

Chairwoman of the Advisory Board of REIsearch

Erika Widegren has been working in the field of connecting science and society for over a decade. She is Chairwoman of the Advisory Board of REIsearch, which is an innovative non-profit European initiative to demonstrate how a technological tool, coupled to a broad network of leading media, research institutions, civil society organisations, and citizens, can help policy makers to make better use of knowledge. Until 2015 Erika was executive director of Atomium Culture's European Institute for Science, Media and Democracy (EISMD). She graduated from the University of Edinburgh in Philosophy and Political Science, where she also continued studies in Economics and Mathematics.

James WILSDON

University of Sheffield, Vice-Chair of the International Network for Government Science Advice (INGSA)

James Wilsdon is Vice-Chair of INGSA and Professor of Research Policy at the University of Sheffield. Previously, James worked as Professor of Science and Democracy at the University of Sussex; Director of Science Policy at the Royal Society; Head of Science and Innovation at the think tank Demos; and Senior Research Fellow at Lancaster University's Institute for Advanced Studies. James is an editor of the Guardian's 'Political Science' blog, and an associate editor of the open access journal Palgrave Communications. He recently chaired an independent review of the role of metrics in the management of the UK's research system, which published its final report *The Metric Tide* in July 2015. Since 2013, he has been chair of the UK's Campaign for Social Science and in 2015 he was elected a Fellow of the Academy of Social Sciences in the UK.

ZAKRI Abdul Hamid

Science Advisor to the Prime Minister of Malaysia and Chair of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)

Zakri Abdul Hamid is currently the Science Adviser to the Prime Minister of Malaysia. From 2001 to 2008 he was the director of the Institute of Advanced Studies at the United Nations University in Japan. Upon returning to Malaysia in 2009, he founded the Centre for Global Sustainability Studies and was appointed by the Prime Minister as the founding chairman of the National Professors Council in 2010. Zakri is one of 26 members of the UN Secretary-General's Scientific Advisory Board and the founding chair of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). He is joint-chairman of the Scientific Advisory Council for Asia and the Pacific and was appointed in May 2016 to the Governing Council of the UN Technology Bank for the Least Developed Countries. Recently, he was elected as a member of the Governing Board of the Global Research Council. Three species are named after him: a beetle (*Paleosephaaria zakrii*); a cicada (*Pomponia zakrii*) and a pitcher plant (*Nepenthes zakriana*).

Alessandra ZAMPIERI

Head of Demography, Migration and Governance Unit, Joint Research Centre of the European Commission

Alessandra Zampieri is Head of the Demography, Migration and Governance Unit in the European Commission's Joint Research Centre (JRC). She is responsible for running the Commission's Knowledge Centre for Migration and Demography (KCMD), which was established in June 2016. The KCMD aims to provide EU policy and decision makers with policy-relevant knowledge and evidence-based analysis in order to strengthen the response to the challenges posed by migration and seize its opportunities and benefits. In addition to supporting the European Agenda on Migration, her unit undertakes research to create and improve knowledge for situational awareness and for anticipating migratory and demographic trends and their impacts on the EU. Alessandra joined the JRC in 2009 after spending several years in Brussels formulating transport policies, first in the competent Commission services and then in the Cabinet of Vice-President De Palacio. At the JRC, she has been Head of the Maritime Affairs Unit tasked with developing scientific and technological methodologies for EU policies related to the sea, including border management.

#EUINGSA16

Conference website:
http://ec.europa.eu/research/conferences/2016/ingsa2016/index.cfm?pg=home

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
  via EU Bookshop (http://bookshop.europa.eu);
- more than one copy or posters/maps:
  from the European Union's representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries (http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/contact/index_en.htm) or
  calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

  (*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

HC-06-16-175-EN-N

How can the communication between science and policy makers be improved? In particular at times when science advice is more and more often requested, but also increasingly contested? This question was discussed through the lens of different policy challenges at the 2nd International Conference on Government Science Advice in Brussels on 29th and 30th of September 2016, entitled 'Science and Policy Making: towards a new dialogue'.

Jointly organised by the European Commission's Scientific Advice Mechanism and the International Network for Government Science Advice (INGSA) the conference attracted 450 participants from all over the world demonstrating the growing importance of and interest in this subject.

The present report summarises the presentations, discussions, and key messages of this conference. The findings contribute to the development of common principles and best practices of science advice to governments and international organisations worldwide.

Research and Innovation policy

Publications Office

ISBN 978-92-79-63020-0
doi:10.2782/977668