



INGSA 2018 Conference

TOKYO, JAPAN

November
6th and 7th,
2018



Conference Report



SCIENCE ADVICE
FOR A CHANGING WORLD

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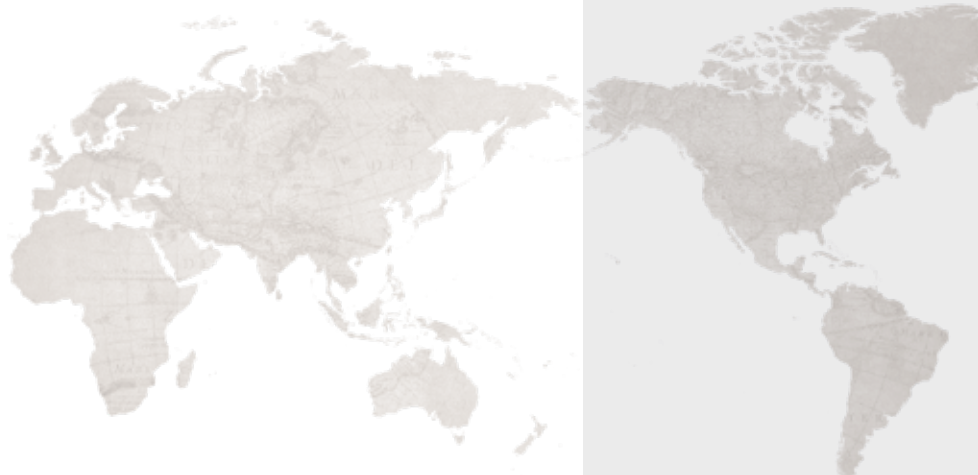
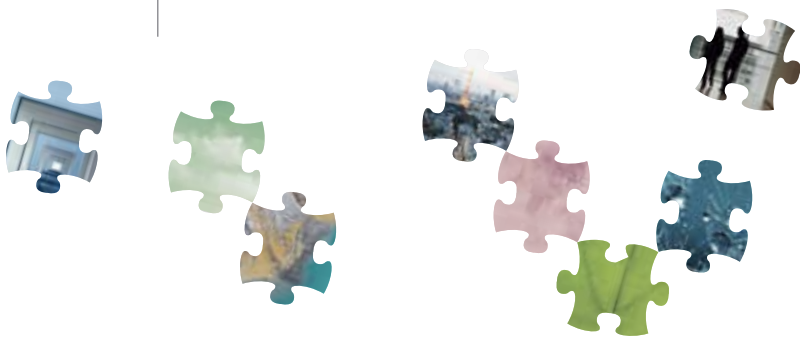
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CONFERENCE REPORT

- 6 Day One Sessions - Tuesday 6th November 2018
- 30 Day Two Sessions - Wednesday 7th November 2018

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Message from Sir Peter Gluckman

**Chair of the International Network for Government Science Advice (INGSA),
Former-Chief Science Advisor to the Prime Minister of New Zealand,
International Science Council President-elect**

It is hard to believe INGSA is only 5 years old.

Born out of the first Science Advice to Government Conference in Auckland, New Zealand, in 2014, INGSA has since delivered over 20 workshops involving almost 1500 attendees. It has forged valuable partnerships with governments and stakeholders in Africa, Europe, the Caribbean, Central America, South America, Asia and the Pacific. The network itself now links over 5000 academics, policy professionals, decision-makers and diplomats from over 80 countries with discussions about best practice, capacity building opportunities and events on every continent.

INGSA is constitutionally part of the International Science Council, newly formed by the merger of ICSU and ISSC. This merger has resulted in an organisation greater than the sum of its parts, with INGSA playing an important role in ISC's work to become the voice of global science.

In 2016, the European Commission hosted the 2nd INGSA conference in Brussels. It was an energising event, that brought together some of the world's most senior and experienced practitioners of science advice. It was the perfect launching pad for INGSA's next two years, which were marked by rapid growth in the network and activities focused in the Global South.

It set INGSA up to strengthen its relationship with long term partners such as the Royal Society, the Wellcome Trust, UNESCO, and the European Commission, while also opening the door to new partnerships with IDRC, UNDP, OECD, and a myriad of organisations and governments around the world.

For the third iteration of the Science Advice to Governments conference, INGSA is proud to have collaborated with the National Graduate Institute for Policy Studies (GRIPS) and the Japanese Science and Technology Agency (JST), to host INGSA2018 in Tokyo. In the two years since Brussels, global events have severely tested science-advice practitioners and systems, as reflected in what has been called the "post-truth" era. Trust in institutions, including the media and policy processes, has been compromised. As social media continues to fuel debate with both reliable and unreliable information, scientific discovery and technological development continue apace, but not without its own controversy, creating challenges at the science-policy nexus.

Deliberately we limited the number of attendees at the Tokyo meeting to encourage networking and deep-dive discussions on these topics. We also targeted the conference around four key themes:

- The operationalisation of the SDGs
- Social and technological transformation
- The future of science advice in a changing world
- Science advice in context – what are the lessons from real world examples of science advice in practice

INGSA2018 proved to be an engaging and forward-facing event, setting the network up for another exciting two years as it looks towards INGSA2020 in Montreal, Canada!

- January, 2019



MESSAGE

Message from Prof. Teruo Kishi

**Chair of INGSA2018 Local Organizing Committee,
Science and Technology Advisor to the Minister of
Foreign Affairs of Japan**

On behalf of the Local Organizing Committee, I would like to express my sincere appreciation to all those who contributed to the great success of INGSA2018 in Tokyo.

I was impressed by the fact that approximately 300 people gathered from more than 50 countries/regions to discuss critical issues under the overarching theme of "Science Advice for a Changing World."

In addition, active engagement of the young generations such as members of Global Science Academy (GYA) was really encouraging also for the future of INGSA.

I have been involved in Science, Technology and Innovation (STI) policy for a long time from a scientific perspective. Since the appointment of three years ago, I have been serving as Science and Technology Advisor to the Minister for Foreign Affairs of Japan.

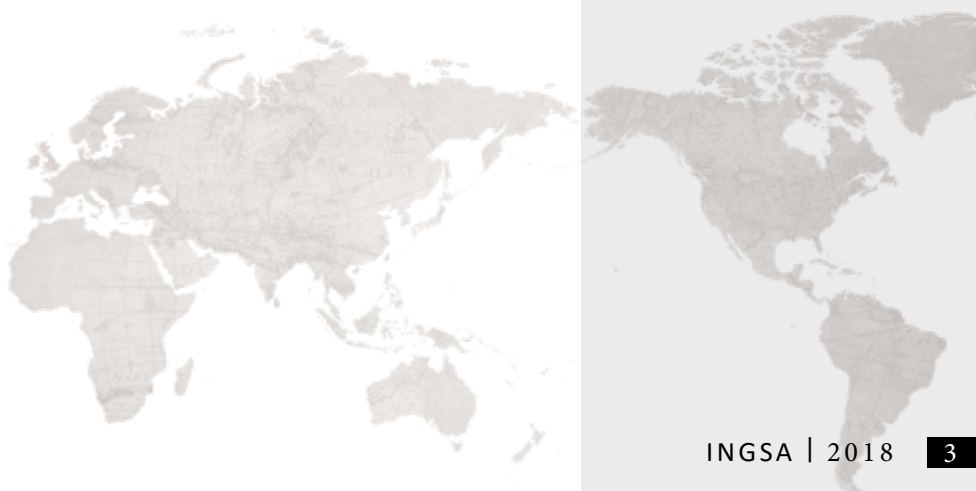
I keenly feel the importance of STI in addressing global challenges such as the United Nations' Sustainable Development Goals (SDGs). Humankind has entered a new era of "digital innovation" led by new fundamental technologies such as the Big Data analytics, Artificial Intelligence, and the Internet of Things, as well as cybersecurity technology and quantum-computing technology.

To unleash such STI potentials for realising a better society, the role of scientific advice to bridge STI and policy-making, is of great importance although it is really challenging for us at the same time.

Therefore, I firmly believe that activities of INGSA will become increasingly meaningful and I would be glad if I could continue to work together to contribute to them.

In closing, I wish you all full success for INGSA2020 to be held in Montreal.

T. Kishi



EXECUTIVE SUMMARY

The 3rd International Conference on Science Advice to Government was held in Tokyo on the 6th and 7th November 2018. Under the title *Science Advice for a Changing World*, the event attracted almost 300 representatives from over 50 countries, demonstrating the reach and value of INGSA's global network.

The event brought together policy professionals, leading practitioners, scholars, and industry representatives to explore the principles, practices, and dynamics of working at the science-policy interface, particularly in relation to pressing contemporary issues such as climate change and the SDGs. INGSA, and its conference partners, worked hard to ensure a high level of diversity in attendance; by gender, by level of experience and by balancing attendance from the Global South and North.

A great deal has changed since the last INGSA conference in September 2016. The theme of *Science Advice for a Changing World* reflected the necessity of scientific, social and policy systems that are strong enough, yet agile enough, to adapt to an increasingly fast-moving world that is becoming hostile to the value of evidence. Policy cycles are now shorter, and the issues they are expected to address are increasingly complex, and increasingly trans-national.

The main theme of the meeting was transformation – environmental, technological, political and social – which is why INGSA2018 chose to use the Sustainable Development Goals as a major focus. These shared goals provide a powerful lens through which science advice, and the mechanisms that underpin it, can have a deep impact on policy, and in doing so, on real people. The overlapping nature of the SDGs also illustrates the complex landscape that science advice practitioners, from all sides, have to work in.

One of the recurring themes of the meeting was the structural and practical issues around operationalising the SDGs and how to turn the SDGs into policy levers that can (and should) be informed by evidence. One of the primary outcomes from the conference was the detailed discussions on how SGD goals interact with one another (Parallel 2.2) and how the work that ISC and INGSA are doing, to practically map these interactions, can be utilised to exert some real policy pull.

The role of Arts, Humanities and the Social Sciences also echoed across many of the sessions, representing the necessity of understanding and incorporating many different types of knowledge (Parallel 2.1). This evolution of the multidisciplinary and transdisciplinarity of effective science advice also covered issues of indigenous knowledge and data sovereignty (Parallel 1.1), informal and grassroots science advice (Plenary 3), and the role of the Private Sector (Parallel 2.3).

There was also a great deal of discussion around the role of science, technology and data in international diplomacy (Parallel 4.3), the changing locus of power relating to cities and urbanisation (Parallel 4.2), and the complexity of coordinating science advice across various levels of government and of stakeholders to provide science advice, when, where and how it is needed (Plenary 3).

The range and depth of debate at INGSA2018 demonstrated how the global discussion of science advice has matured since INGSA was founded. The conference also demonstrated the range of activities INGSA is now involved in with satellite meetings on parliamentary science advice, science diplomacy, urban science advice, and on the role of data in policymaking.

There were also a number of key announcements on the future of INGSA: an expansion of INGSA's regional chapter network to North America and Europe; a new Science Diplomacy Division; the creation of a Parliamentary Science Advice Division; and INGSA's role in the newly-formed International Science Council (ISC).

The 2018 INGSA conference demonstrated the international appetite for developing the discipline of science advice, building on a network of engaged and committed experts from every aspect of the science and policy systems.

Despite the numerous issues that the world faces, all the conference sessions were optimistic of the role that science and honest brokerage will play in shaping a sustainable and just world.



AIMS OF THE CONFERENCE

The theme of *Science Advice for a Changing World* encompasses the urgency of our common challenges and global goals; the unprecedented speed of scientific discovery and application; and the shifting public view of both science and policy making in the emerging 'post-trust' society. The theme informs the objectives of the programme, which are:

- 1) To enable critical reflection and interdisciplinary dialogue on the practice and place of science advice in policy making. Public policy is a values-based domain where, in a democracy, policy makers and politicians try to reflect public attitudes and demands. Societies need a critical understanding of the utility and limits of scientific evidence in policy processes, and to know how to weigh this against other considerations in context.
- 2) To support the operationalisation of the SDGs by better understanding the role of science advice and evidence-informed policy in promoting them.
- 3) To consider strategies to further improve the provision of evidence-informed advice to public policy at all levels of government. In providing evidential input it is important to also consider the ethical and societal implications of how scientific knowledge and technology are applied.

THANK YOU

INGSA2018 would not have been possible, nor such a success, without the hard work of a great number of people - all of which it is impossible to thank individually. In particular, INGSA would like to express our gratitude to:

- The INGSA2018 Programme Committee
- Prof Kishi and the INGSA2018 Local Organising Committee
- Prof Tateo Arimoto and Mr Satoru Ohtake, for their vision and long-term support
- Mr Kazuhito Oyamada and his team at GRIPS for their great work behind the scenes
- The management of GRIPS for their generous support and for providing the excellent venue
- To all of the conference partners and sponsors who enabled INGSA2018 to be a diverse and inclusive global event
- To all of the speakers and delegates for their time, enthusiasm and expertise before, during, and following the conference

This conference report has been compiled with the assistance of:

Main Author:	Mr Grant Mills	
Contributors:	Mr Kazuhito Oyamada Mr Noel Kikuchi Ms Lara Cowen Ms Kristiann Allen	
Rapporteurs:	Dr Mahesh Kumar Dr Mirabbos Hojamberdiev Dr Shaheen Motala Timol Dr Amal Amin Ibrahim Shendi Nada Mr George Asiamah Ms Ana-Maria Iliev Mr Alessandro Allegra	Mr Oscar Reyes Dr Richard Glover Ms Farah Atiqah Ismail Mr Alex Clegg Dr Bernardo Urbani Dr Shalini Arya

CONFERENCE RESOURCES

All conference resources are available at: www.ingsa.org/ingsa2018/resources/

These include Plenary videos, session podcasts, individual presentations. Session transcripts available on request.

OPENING SESSION

To a packed hall, the INGSA2018 conference was opened by Prof Teruo Kishi, Conference Co-Chair and Science and Technology Advisor to the Japanese Minister of Foreign Affairs. Highlighting that it was the first time the INGSA conference had been held in Asia, he also framed the conference against the upcoming 20-year anniversary of the UNESCO Declaration on Science and the Use of Scientific Knowledge.

In light of this document, he noted that the role of science in overcoming social challenges is getting more and more important. “Social science and natural science should be harmonised, since innovation cannot be created only by technology development,” Prof Kishi said.

This need for harmonisation, he noted, was perfectly illustrated by the merger of ICSU and the ISSS to create the International Science Council (ISC), and will strongly promote this harmonisation. Prof Kishi wished INGSA and conference participants full success in tackling the big questions posed by the conference themes, and also in building new networks between the diverse stakeholders in the room.

Participants were further welcomed to the event by Prof Akihiko Tanaka, President of the National Graduate Institute for Policy Studies (GRIPS), the conference host. He provided a valuable background to the work of GRIPS, a national university established in 1997 that provides Masters and Doctorate programs.

“It aims to contribute to the development and advancement of democratic governance both in Japan and abroad, through research and education in governmental policy and policy reform,” Prof Tanaka said. Currently GRIPS draws 70% of its students from overseas, from over 50 countries, and GRIPS alumni have gone on to occupy senior positions in their home countries.

In 2014, GRIPS established the Science for Re-designing science, technology and innovation policy (SciREX) program, based on the MEXT, with an aim of the SciREX Centre being a bridge between policy and science. Prof Tanaka closed by highlighting the synergies INGSA and GRIPS, and once again stated that it was a pleasure for the institute to host INGSA2018.

If we look at the landscape of the interface between science and policy there is good news, sad news and bad news

Mr Michinari Hamaguchi, the President of the Japan Science and Technology Agency, followed up these thoughts with a reminder that even though Science, Technology and Innovation (STI) will be critical in achieving the Sustainable Development Goals (SDGs), it is not a silver bullet.

“As the influence of STI grows, we are required to consider more about the healthy, ethical, legal and social issues of STI. Before we introduce new technology to society it is important to communicate with various stakeholders...to build consensus and trust and prepare social systems to accept the new technology,” he said. Japan and JST have taken a global lead on STI for SDGs and is helping to guide international STI policy, including on science advice. That is why, Mr Hamaguchi concluded, JST was so glad to co-organise the INGSA conference.

Prof Kazuhiko Takeuchi, Vice-President of the Science Council of Japan (SCJ), was next to take the stage. Like Prof Kishi before him, Prof Takeuchi, emphasised the role of the SCJ to represent not only the natural sciences, life sciences and engineering, but also the humanities and social sciences. “The international science communities are aware that the integrating of knowledge and wisdom of all fields of science is inevitable to cope with the emerging issues around the world,” Prof Takeuchi urged.

The Opening Session was concluded by The Presidential Remark, delivered by Sir Peter Gluckman, Chair of INGSA, who highlighted the great strides that INGSA has taken since its establishment. Yet, while INGSA has helped facilitate a vibrant international discussion around the role and nature of science advice, there is still a long way to go.

“If we look at the landscape of the interface between science and policy there is good news, sad news and bad news,” Prof Gluckman stated. “The good news is reflected in the many countries and organisations that have partnered with us to build both individual and institutional capacities at the interface.”

“The sad news is how few countries have a holistic and multivalent science advisory ecosystem, and there remain deficits both within the policy community and the science community that complicate and muddy the interface. The bad news is also about the rise in populism, and the associated explosion of fake news, false facts, manipulated information, loss of trust in institutions and experts, and the shortening of the policy cycle that makes the role of robust evidence even more important and more difficult.”

He reminded the conference that the issues policy makers most often need assistance with are the very ones for which the science is often incomplete – in a world of greater uncertainty, both science and policy need to be careful how they navigate and mitigate these ambiguities in a changing world.

KEYNOTE I - MS HELEN CLARK

Former Prime Minister of New Zealand

The Rt Hon Helen Clark is a former Prime Minister of New Zealand, was for 8 years the Administrator of UNDP, and continues to be an active global citizen on various issues, including international development and drug reform.

She began the opening keynote of INGSA2018 by congratulating INGSA, and the program, on placing Agenda 2030 and the SDGs at the heart of the conference.

“If implemented in full, [the SDGs] would transform the prospects of the world’s people and secure the future of the world’s ecosystems,” she emphasised.



In providing a detailed and ambitious vision of the future, the SDGs will be critical in the world achieving a sustainable and just future. But, she was quick to remind participants, progress on the goals is yet to really be felt, and in many instances the world continues to trend in the wrong direction.

The number of hungry people in the world has risen for the past 3 years, now standing at 821 million – or 1 in every 9 humans. Yet the SDGs aim to eradicate hunger by 2030 – an impossible task on the current trend.

“Then we come to the failure of economies to generate enough employment and livelihoods for fast growing populations. The level of global unemployment has stabilised around 5.6% but vulnerable employment is on the rise, and the rate of reducing working poverty has slowed.”

To achieve Sustainable Development Goal 8 – full and productive employment for all – will take dramatic action and innovative social policy around basic safety nets and social protections is going to need to be part of that.

There are many governments prepared to follow such a path but for others, a dispassionate analysis of challenges and options is just one of those inconvenient truths

She continued by highlighting the poverty of opportunity, along with the conflict and political insecurity that continues to drive a lot of informal migration. This informal migration in turn leads to exploitation, death or injury for many.

“We have an SDG 10 target that is calling for the facilitation of orderly, safe, regular and responsible migration and mobility of people through planned and well-managed migration policies. But moral panic in a number of the destination countries currently stands in the way of achieving that.”

“By the end of last year the numbers of people worldwide who are classed as forcibly displaced stood at 68.5 million, a rise of 2.9 million on the year before. Yet we have SDG 16 calling for the creation of peaceful inclusive societies based on the rule of law,” Ms Clark mused.

“On current trends we often seem to be moving away from, not towards, that objective.”

She adds to the list that income inequality is on the rise almost everywhere in the world, as well as ongoing environmental degradation and the impacts of climate change.

“We have the issues of environmental degradation...biodiversity loss, desertification and the warming climate, with so many consequences for human development.”

“We have 3 Sustainable Development Goals relating directly to the environment including one specifically on climate change. All of these will need much more commitment from the UN’s member states if they are to be achieved,” she said.

It is these growing gaps between reality and success that underline the effort required to achieve the Sustainable Development Goals. To accomplish the herculean task that we have set for ourselves, efforts will require drawing on all relevant knowledge and capacities and effectively organising governments and mobilising civil society.

Yet this assumes that governments actually want to embrace the agenda and take steps to implement it, Ms Clark cautions.

This means that governments must be “prepared to be open to analysis of, and advice on, what the challenges actually are and their scale and then to consider responses based on that advice.”

“There are many governments prepared to follow such a path but for others, a dispassionate analysis of challenges and options is just one of those inconvenient truths.”

“In a post-truth or fake news setting, science will be challenged and so will the solutions that are based on it.”

She pointed to three examples where populism, denialism, or fear of short-term political consequences points policy in the opposite direction to the evidence:

- Climate Change: “To stay below the Paris Agreement target of 1.5 degrees, there would need to be what’s described as a World War II level mobilisation to stop the use of fossil fuels.”
- Drug Policy: “The 2030 agenda exhorts us to leave nobody behind in development. But one group that is consistently marginalised and often demonised is that of people who use drugs...A prohibitionist approach is mandated by the UN Conventions, which actually refer to drug addiction as ‘an evil’, and it’s a short step from that to seeing those who use drugs as evil”.
- Inequality: “High levels of inequality place enormous strain on social cohesion and have particularly poor outcomes for the most disadvantaged in such societies. But often governments are resistant to acting on the evidence of such social stress, even preferring to blame the victims of it for their plight.”

For Ms Clark the solution can only be for policymakers to seek the very best advice they can, to evaluate it rigorously, to make their decisions accordingly and to monitor the outcomes so that course corrections can be made as required.

“As a leader, you have to know a little about a lot and you need to know who you’re depending on who knows a lot, if you’re to make good decisions.”

“Embarking on decision making without such input is a very, very risky endeavor. Which, of course, doesn’t mean that it doesn’t happen...”

“As a realist, I consider that very major, complex, and interlinked challenges are standing in the way of achieving the SDGs and national aspirations for human development,” she concludes.

“As an optimist, I know that to address those challenges, we need a sound knowledge base, good analysis and the right policy tools. All of you who work at the science policy interface have critical roles to play in supporting the design of evidence-informed policy, which can rise to meet global and national goals.”



PLENARY I

The SDGs and the Science Policy Interface

The Sustainable Development Goals (SDGs) are a critical framing device for progressing both national and the global agendas. In nearly all of the SDGs, natural science, social science, data science, technology, economic and political science, and particularly implementation science will be needed.

Chaired by Emeritus Professor Yuko Harayama from Tohoku University, the session explored the ways that science relates to the SDGs. She opened the session by challenging the panel to consider the complexity of the drivers now influencing social, technological, and democratic change – from #MeToo to the nature of the surveillance state. What are the positives of these changes? And what are the risks of misuse on global human development?

“We hear, almost everyday, about STI for SDGs,” Prof Harayama said. “It’s neither a mature concept nor an eye-catching slogan, and it is very politically challenging. And challenging for policy makers.”

Mr Matt Wallace, Senior Program Officer at the International Development Research Centre (IDRC) readily picked up on this issue of difficulty.

“SDGs and research is not just about ticking a box, and the SDGs really have the potential to be transformative in the way we think about research - transformative in the way research agendas are set and implemented,” he said. “But this requires capacity, it requires resources, it requires political will, especially at the national level.”

“Programs such as the [IDRC-supported] Science Granting Councils Initiative are really about that: Enabling funding agencies to set agendas, deliver on agendas effectively through transparent research processes.”

While fostering joint efforts like the sub-Saharan Science Granting Councils Initiative is important in aligning resources and national priorities, Mr Wallace emphasised that it was equally important to support the broader ecosystem of STI. “This includes technology intermediaries, it includes accreditation agencies, it includes different faculties of the universities, it includes science academies.”

“This isn’t just a policy-for-science issue but also a science-for-policy issue...There are very few structures and very few networks in place in many parts of the Global South that can really focus on science advice and that can enable SDGs to be part of the science ecosystem.” This opportunity to rapidly grow capacity in some of these regions is what drove IDRC to partner with INGSA.

Mr Wallace illustrated this point by introducing the six 2018 INGSA Research Associate grantees, funded by IDRC, to advance the discussion around science advice and the SDGs in their individual regions.

Understanding complexity

One of the recurring issues of the session related to the complexity of the SDGs and that making any substantial gains would rely on a greater understanding of how they interacted, and translating these interactions into actionable options for policy-makers.

“The neat packaging of the Sustainable Development Goals masks their complexity and their strong inter-relatedness,” said Prof Daya Reddy, President of the International Science Council.

“Without a deep understanding of this inter-relatedness there is a danger of embarking on approaches that lead to conflict between different goals.”

And the accomplishment of the goals is not necessarily aided by the manner in which the SDGs were derived, nor the ambitious breadth of their goals.

“The 169 targets that underpin the 17 goals are not at all perfect,” Prof Reddy points out. “Just under a 1/3 of the targets are well defined and based on the latest scientific evidence. 17% are weak or non-essential, that rather than relying on hard, measurable, quantitative outcomes, many of the targets are framed around vague language.”

Just under a 1/3 of the [SDG] targets are well defined and based on the latest scientific evidence. 17% are weak or non-essential... many of the targets are framed around vague language



Ms Helen Clark was head of UNDP at the time the SDGs were being formulated and undertook a lot of advocacy around what they could be.

“My view, and I think the view of many in development, was that you needed few goals and they needed to be measurable,” she said.

“We didn’t end up with that because member states negotiated the agenda and no one wanted to leave anything out...what Daya [Reddy] said is absolutely right, many of these targets are not actually measurable at all, a lot of them are simply political statements.”

Yet she offers a counterpoint to this, remembering that when the Millennium Development Goals (MDGs) were announced there was a sense that they had been handed down from on high, rather than formulated through consultation.



At least with the SDGs, there was a lot of engagement in their creation and it has resulted in much greater awareness around them. And the key to their success will be in keeping the debate around the SDGs front and centre, in a world where politicians and policy-makers are constantly ‘bombarded’ with new agreements, agendas, and priorities.

For example, she lists the Sendai Framework, the Paris Accord and the SDGs to name but a few. For the SDGs to be operationalised in policy, countries need to pick and choose what they can do, they need to look for the common ground and principles across these competing priorities.

“Because if you pursue these agendas in vertical silos, as well as your national development plan, then you’ll spend so much time writing reports that you never get onto any action at all...What are things you can do that will have the greatest multiplier effects? We need to be quite practical about this,” Ms Clark concluded.

Even though many countries are struggling to integrate the various international and domestic priorities into workable policy solutions, Mr Wallace from IDRC, reminded us that there are solutions.

“Some of the trends that can counter that are regional collaborations, especially smaller countries being able to partner with each other. For example, to launch joint calls on an SDG that’s of particular interest to them, and really being able to identify what are the big wins and transfer that into a research program,” he said.

The confusion between National Development Plans, STI plans and SDGs plans is making it very difficult to have a language that all three communities actually understand.

Roadmapping STI for SDGs

INGSA2018 host country, Japan, is leading the world in driving STI for SDG principles. Dr Michiharu Nakamura is Counsellor to the President of the Japan Science and Technology Agency (JST) and is a member of the 10-member group supporting the UN’s Technology Facilitation Mechanism (TFM).

There is no denying that technological advancement – and the sharing and adaption of that technology for development – can have potent benefits to lives. Whether it is the cheap provision of electricity to remote communities or providing mosquito nets to fight malaria infection, there are endless possibilities for STI to be a part of inclusive development.

Yet, as Dr Nakamura pointed out, the process faces numerous challenges to assure fair, equitable and inclusive benefits, identified in brief as:

1. Deep insight on the impacts of new technologies and exchange of knowledge, initiatives and practices
2. STI for SDGs roadmaps for ensuring coherent multi-stakeholder’s action and tracking progress
3. Engagement of science communities, funders and the private sector
4. Deploying, financing and scaling technologies for innovations with local/indigenous knowledge
5. On-line platforms for delivering transformative results
6. Impact investment with both a social purpose and a financial return
7. Support for inclusive technology facilitation mechanisms
8. Engaging youths and diversity into STI for SDGs activities

Core to the success of successful implementation of STI for SDGs is embedding mechanisms within the political agenda, facilitated by the negotiation of the science/policy interface.

“It is important to establish national development plans which have STI strategies as integral elements. It is possible by close collaboration with science community, business sectors and society,” Dr Nakamura believes.

Key to Japan’s STI for SDGs strategy is to develop comprehensive roadmaps across government that include measures to track progress.

Yet Dr Nakamura highlighted that even in Japan, a country where the concept of roadmapping STI for SDGs is supported by the government, it is very hard to get a national level roadmap in place.



Many of the Ministries will have roadmaps but that integrating them into a national level strategy is challenging. Even more challenging is the moving to international roadmaps, a conversation that organisations like the World Bank and JST are only now starting to have.

Building on the importance of coherent strategies, roadmapping, and evaluation, was Mr Klaus Tilmes, Senior Advisor on Science, Technology and Innovation at The World Bank Group.

Since 2015 The World Bank have been expanding their collaboration with the UN on understanding the role and potential of STI in development.

“We have conducted, jointly, the first review of all global STI programs that the UN is doing,” Mr Tilmes said. “It has been a real eye-opener to see how much the UN and the global community is doing, but it actually pales in comparison to what bilateral and regional organisations are doing.”

What has come out of this global evaluation is the recognition that the world needs to move way beyond fragmentation and duplication of programs at the international level.

“We need a coherent framework, thorough STI for SDGs roadmaps, we need to re-orient the STI agenda, as the first order of importance, on implementation at the country level. And we need to elevate the dialogue to decision-makers at the political level and that means going beyond the Ministries of Science and ICT.”

“The idea that STI for SDG roadmaps would just fall from the sky is of course a complete illusion, because this is such a novel concept, that there is, up to now, very little evidence of how this could actually be done,” he said.

Mr Tilmes highlights the work of China and India in being able to effectively encompass STI in their national strategies, but he concludes that they are the exception.

“The confusion between National Development Plans, STI plans and SDGs plans is making it very difficult to have a language that all three communities actually understand.”

“It is making it very difficult to have a coherent conversation between science, technology and innovation communities as well as policy makers.”

For Mr Tilmes, 2019 is a year of huge opportunity for the STI community and for governments wanting to enhance the outcomes of STI on their development goals. “Under Japan’s leadership, the topic of STI is going to be raised at the G20 level; it is a major topic of discussion in the convention around TICAD, where all the African heads of state and leaders are coming to Japan.”

“It is an opportunity for Prime Minister Abe to represent the UN STI community in terms of reporting back on SDG’s progress, and it is an opportunity to call for a stronger and a renewed mandate at the global level,” Mr Tilmes continued.

“When the SDGs were first adopted I don’t think any one of us a clear sense of what disruptive technologies might look like.”

While the SDGs are essentially aspirational goals and it will take work to make them politically and practically achievable. Science and evidence are critical to all stages of this process: providing justification to governments, orienting the goals within existing interacting plans, deriving roadmaps and direction, and understanding the technological opportunities within national and international contexts.

PARALLEL SESSION 1.1

Human Wellbeing in a Digital Age - Are there new measures and considerations needed in the face of pervasive technology?

Wellbeing is broadly defined as an individual's capacity to realise healthy and successful opportunities in the personal, social and civic spheres of their life. From smart phones to AI, digital transformation is influencing societal networking, interpersonal communications, state surveillance and almost every other aspect of how people interact with each other, their communities and their governments. This rapid uptake and pervasive nature of digital technologies is resulting in profound and complex changes in the fabric of society that needs to be understood.

Should technology be regulated? What is the role of government in managing these changing social interactions, or does the responsibility lie elsewhere?

Session chair and Secretary of INGSA, Ms Kristiann Allen, began by framing the debate against the backdrop of INGSA's recent [Digital Wellbeing report](#)¹ undertaken for the [OECD's Going Digital initiative](#)². The report highlighted the need to be able to better define – and where possible define measurements for – the vast unknowns and uncertainties of the digital age on human wellbeing.

Echoing this, much of the discussions in the session was threaded through with the theme of 'inclusivity' and the challenge of making sure that the Digital Age did not mimic past revolutions in providing vast benefit for most, at the expense of other groups. It was generally agreed that the creators, regulators and beneficiaries of technological change bore some of the responsibility for ensuring that digital transformation benefits everyone.

Prof Toyoaki Nishida from the Graduate School of Informatics at Kyoto University picked up on this theme by quickly emphasising the need for finding a shared discourse between developers of technology and its users.

People need a complex set of skills, subskills, mix of cognitive and emotional skills to navigate safely in that new digital environment

"The key issue in communication is what I call a common ground," he said. "The common ground is something that is shared prior to conversation and something participants keep updating during communication. But unfortunately common ground is not visible all the time. We can observe only part of it."

"Making this common ground visible to everybody is a very, very challenging task."

Dr Fabrice Murtin, Head of Section at the OECD in the Households Statistics and Progress Management Division, echoed some these issues by underlining the importance of addressing our collective knowledge gaps. He led with an explanation of the OECD's work, including the 'How's Life?' publications, and the difficult task of operationalising the measurements of wellbeing.

"Regarding quality of life, it consists of health, worklife balance, education, social connections, civic engagement and governance, environmental quality, personal security and subjective wellbeing," Dr Murtin said.

"It also includes material conditions, which are income, jobs, and housing, and we also conceptualise the sustainability of wellbeing, namely the wellbeing of our children tomorrow."

The OECD subsequently releasing their report '[How's Life in the Digital Age?](#)³ in February 2019, which contained three main contributions – a literature review, the operationalisation of this knowledge by identification of key indicators and then quantifying digital risk and opportunities.

"Digital transformation brings about many opportunities to people because it provides information for free...it makes, in general, human activity more efficient. On the other hand, there are several risks attached."

"The first one is digital divide. Since there is inequality in internet access and overall usage and inequality in digital skills, this is another form of inequality that is superimposed to existing socioeconomic inequalities."

"The second point is the lack of digital literacy. As digital life gradually substitutes to physical life, people need a complex set of skills, subskills, mix of cognitive and emotional skills to navigate safely in that new digital environment."

1. <https://www.ingsa.org/wp-content/uploads/2018/10/INGSA-Digital-Wellbeing-Sept18.pdf>

2. <http://www.oecd.org/going-digital/>

3. <http://www.oecd.org/publications/how-s-life-in-the-digital-age-9789264311800-en.htm>



“The third type of risk is linked to digital insecurity, which is linked to data privacy, cyber hacking, cyber bullying.”

For Ms Mylène Deschênes, Director, Ethics and Legal Affairs, Office of the Chief Scientist, Fonds de recherche du Québec, understanding of the dynamics behind digital wellbeing is fundamentally tied to human values. “There are lots of papers showing a link between psychological and social wellbeing in values. And although these links are not linear, for instance, healthy human values are more likely to correlate with wellbeing,” she said.

“We need to study human values, how they will shape our choices in front of this digital preposition and also how the digital environment proposes values or imposes values on human beings.”

Drawing on the work of Professor Shalom Schwartz, University of Israel, Ms Deschênes illustrated the inherent value trade-offs being encountered in the digital sphere, for example, between autonomy and security. In order to understand how wellbeing is affected, it is key to understand how people’s values are expressed or manipulated in the digital realm.

“The high capacity of social media to influence human behaviour combined with the incredible capacity to analyse massive amounts of data and to use these in automated decision-making through AI, also raise question about the controls of these new forum...that are being introduced in our daily life without a clear understanding of it and of the impact on our collective and individual wellbeing,” she emphasises.

She also highlighted the risks to democracy through the biased control of data access, the need for neutral or transparent search engines and net neutrality.

Following this was Professor Tahu Kukutai from the University of Waikato, New Zealand, suggesting that the pure development of indicators and metrics will not be enough to enforce change. Nor will it necessarily encompass the subtleties of what is meant by ‘wellbeing’ in culturally specific contexts.

“I am less convinced that doing more measurement and doing more monitoring is the most effective response,” she challenged.

“There is an important opportunity for those working at the science policy interface to not just monitor the impacts of technologies on the wellbeing of key institutions...but also to take a much more active role in understanding how these institutions can be strengthened and supported.”

I have seen and felt very real scenes of frustration over the way in which wellbeing is represented and misrepresented, the biases that are implicit and explicit in those conceptualisations

This requires an investment in capacity and capability and that this empowerment might not necessarily be aligned to the multinational corporations that are currently driving change. This is complicated by the fact that nation states are not immune from external influence in a global world, she said.

“I very much appreciate the difficulties involved in the science of conceptualising and measuring very complex social phenomenon.”

“[But] I have seen and felt very real scenes of frustration over the way in which wellbeing is represented and misrepresented, the biases that are implicit and explicit in those conceptualisations, but more importantly how those representations, those data narratives, are then acted upon in a very top-down way with respect to policy interventions.”

For Indigenous communities, such as those Prof Kukutai has worked with, they often have very well developed ideas of what wellbeing is, yet national policymakers fail to connect to this indigenous intelligence.

“The indigenous data sovereignty movement kind of crystallises many of the opportunities and risks associated with digitalisation, in particular with data-driven monitoring and surveillance, and provides a window into what strengthening institutional capability and capacity might look like.”

Dr Kukutai spoke powerfully about the ubiquitous situation of indigenous peoples around the world, and how this is reflected in systematic weaknesses in national data collections. And that identifying these weaknesses could offer a roadmap for change.

She also uses New Zealand as an example of positive steps that can be taken to help rectify these biases and oversights, including a recent commitment from the country’s chief government statistician to “to co-design data governance across the whole of government data systems in order to give indigenous people a real stake in decision-making.”

Wrapping up the presentations was Professor Yuko Harayama, Emeritus Professor from Tohoku University, who provided a summary of many of the speakers before her. Key to remember is that, what defines digital wellbeing is a deeply personal and subjective affair, constantly changing, or at times even possibly reversing, what constitutes benefits.

It is this duality, that digital technology is able to amplify the positive and negative aspects, which needs to constantly be considered and re-evaluated. It is absolutely necessary to have data to enable these re-evaluations but it is important not to forget that somethings cannot be measured, but are equally important.

This segued neatly into the discussion section, where there were questions and discussions on:

- How can we bring in this concept of wellbeing not just into GDP for countries, but also to corporate bottom lines?
- The OECDs future work on the business impact on wellbeing
- How indigenous peoples can get value from their data
- The nature of wellbeing as an idiosyncrasy.

What defines digital wellbeing is a deeply personal and subjective affair, constantly changing, or at times even possibly reversing, what constitutes benefits



PARALLEL SESSION 2.1

The Role of Arts, Humanities and the Interpretive Social Sciences in Advancing Knowledge Advice for the SDGs

It is undeniable that today's global challenges are fundamentally social issues. Achieving the collective consciousness and risk-awareness necessary for the change required will mean profound shifts in individual and population attitudes and behaviours – solutions which are not typically the remit of the natural and physical sciences and technology.

How have the arts, humanities and social sciences approached the issues? In what ways are they helping to advance the SDG agenda, both in their own right and in collaboration across disciplines? What can we learn from observing other disciplines and how can lessons be applied collectively?

The session moderator, Prof David Budtz Pedersen from the Humanomics Research Centre at Aalborg University, began by acknowledging that generally the social sciences and humanities exists at the outer limit of the science advice discussion, but that the tide was turning.

"We have seen in the last 18 to 24 months some new geopolitical challenges emerging that really call for social science and humanities expertise," he began, illuminating the current crises of institutional trust and citizenship.

People are fundamentally wrapped up in systems, in infrastructures, very often not of their own choosing...We really need to be mindful of the wider context of this kind of entanglement

"All that goes back to issues that we have been researching for many years, if not decades, if not centuries, within the humanities and social sciences."

"Looking deeply into the SDGs, one will actually find quite a lot of open research questions for the humanities and social sciences, look at something like building institutions promoting justice and peace, stimulating more gender equality, better education."

On that note, Prof Budtz Pedersen welcomed Dr Sujatha Raman, Director of Research at the Centre for the Public Awareness of Science at the Australian National University.

"People are fundamentally wrapped up in systems, in infrastructures, very often not of their own choosing," Dr Raman reminded the audience. "We really need to be mindful of the wider context of this kind of entanglement of people in a wider context and think about the importance of this for science advice."

This is one of the ways that social sciences can bring real value to policy advising, by underpinning how issues are framed and allowing different framings. This is of particular value when tackling something as complex and human-centred as the SDGs.

"This distinction between social factors and physical or technical factors when it comes to science advice is just a convention and so I would argue that given the complexity of the SDGs...we do need to pay attention to ways of engaging."



To illustrate, Dr Raman offers the example of SDG 7 – Energy – as an example of the role of tradition in motivating people's choices, and how these cannot be understood purely in economic or technical terms. For example, the preference for using charcoal fuels rather than LPG can be predicated on the fact that some traditional foods taste better when cooked with charcoal, or the fact that a thriving value chain underpins the charcoal industry.

In this way, one of the key values of social science is in offering a sense of where to look for sources of knowledge, she advises.

Next to present was Ms Christine Weidenslaufer from the Chilean Library of Congress, on the critical role that the law experts can play in shaping policy outcome.

Despite being a relatively small, developing country, Chile has had a parliamentary technical advisory service for 10 years. This service is a non-partisan, in-house information provider that aims for transdisciplinarity in all its work.

As a competitive law expert, she has seen the value of engaging social scientists in the policy-making process to provide novel solutions to parliamentarians.

She provided an example related to SDG-15 – Sustainable Development – and the challenges encountered specific to the Chilean governmental system, to institute legislation to conserve and restore terrestrial and inland fresh water and forest ecosystems.

“Supporting the parliamentarians, we figured out a way to create this new institution, which has been working now for 2 years and we think is a good example of how integrating different experiences and professions within our advisory service, can provide unique outcomes.”

Radical interdisciplinarity

Prof Matthias Kaiser, Director of the Centre for the Study of the Sciences and Humanities at University of Bergen, wasted no time in grabbing people’s attention with the name of his talk: Radical interdisciplinarity: when post-normality becomes the rule and all knowledge becomes soft!

To explain this, he suggests that true interdisciplinarity is not the collaboration between the microbiology department and the chemistry department; it is taking microbiology to the law, philosophy or sociology department.

“First, there is the holistic challenge that complex issues call always for radical interdisciplinarity, the SDGs will be the example,” Prof Kaiser said. “The other side of the coin is that, internally, I think we are not quite ready for that.”

He suggests that there is a great deal of lip service offered to the involvement of social science in dealing with so-called wicked problems; that generally it means treating the humanities as an addendum to the physical sciences, or relegated to evaluating the social or cultural consequences of an intervention, or how to achieve social license for a new technology. Radical Interdisciplinarity means having Social Scientists right up there in front from the start.

For Prof Kaiser, another key value of the social sciences is the ability to give cold indicators a narrative that not only enables understanding but also allows them to be more culturally specific.

“The voice of science – and that includes also the social sciences and humanities – we need to provide some more quality of narratives around them and make them local and adapt them and break them down into more concrete issues,” he said.

“If you make it more local, if you make it culturally adapted, you can avoid some of the biases that are built into these global composite indicators.”

Social sciences... give cold indicators a narrative that not only enables understanding but also allows them to be more culturally specific.

The four big challenges to science advice:

I. The holistic challenge:

- Complex issues call for radical interdisciplinarity
- Internally, science is not yet prepared for this.

II. The pragmatic challenge:

- There is no easy balance between the wants of the recipient and the scientific advice given with integrity.

III. The post-normal challenge:

- Integrate uncertainties, values and alternative knowledge sources.
- Provide knowledge quality assessments.

IV. The trust challenge:

- Threats not only from the outside, but significantly also from inside science: a crisis
- Good knowledge requires context and historical reflexion.

Producing quantitative data is all well and good, but involving quantitative data in a qualitative process, such as decision-making, has its risks. He quotes Campbell's Law: "The more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor."

He suggests that the objective system to monitor and navigate the quality of sciences are in fact counterproductive. "The more they measure your quality of your output by the number of publications, the more you will disregard what's in the publications, but just count the numbers," Prof Kaiser warns.

Next to speak was Prof Marc Saner, Chair of the Department for Geography and Environment at the University of Ottawa, following on with the statement: "It's hard to get from good data to good advice."

Speaking around the issue of environmental ethics, Prof Saner identified some of the great strengths of involving the arts, humanities and social sciences as helping decision-makers avoid the mistakes of the past, and enabling more appropriate metrics that ideally lead to better science advice.

For at least 100 years, the human race has been developing its understanding of our place in the ecosystem of the earth, and the environment forms a fundamental piece of the SDGs. Yet, he warns, when it comes to the SDGs we need to be aware of our own biases.

Science is saturated with values...the choices of things that get funded for research and things which don't, which as far as I can see are all purely values-based subjective judgments

"If you actually separate the anthropocentric perspective and the eco-centric perspective, you can very clearly see that the language of [the goals] is very human focused."

"It is a problem if it leads to a naïve form of human-centred indicators where we just believe that by taking good care of ourselves, we automatically will take care of the planet."

This wrapped up the presentation section of the parallel, but the panel session was joined by long time INGSA collaborator, Mr David Mair, Head of Unit at the European Commission's Joint Research Center. He was very quick to build on the comments of both Prof Kaiser and Prof Saner.

"The great news about social science and humanities (SSH) is that it can really help, because people in SSH understand values and they know how to talk about them," Mr Mair said. "They enable us to be very clear when we are talking about the facts and when we are talking about the values."

He then picked up on a thread from Dr Raman's speech, that science is saturated with values and that it is something that is never talked about enough.

"The place where [science] is really saturated in values is...in the choices of career people make and then the choices of research questions they decide to follow, and the choices of things that get funded for research and things which don't, which as far as I can see are all purely values-based subjective judgments."

"If you scratch people who are unhappy with evidence-based policy, what you discover very often is they are not unhappy with evidence-based policy per se. No one really thinks that gut instinct will help you make better decisions."

"What they're unhappy with is that certain pieces of science have either been researched or not researched and are taken into account in the process. That's the problem."

So for Mr Mair, the most important values-informed piece of the evidence to policy puzzle are the decisions right at the beginning of the process where you decide what you are going to fund and which evidences can you count towards the debate.

Discussions in the Q&A revolved around:

- Defining the different types of values, in order to not compromise the validity or perception of science
- The necessity of cognitive diversity and practical ways to encourage interdisciplinarity
- The holistic nature of the SDGs over the MDGs

PARALLEL SESSION 3.1

Building trust between evidence brokers and multiple audiences

Invited panellists in this session had a wealth of experience in providing science advice and analysis of science advisory situations, including the most challenging. Representing esteemed advisory organisations and with plenty of stories and lessons to share, panellists were asked to explore the break-down and rebuilding of trust and why it is essential for any hope of evidence-informed policy.

This session was moderated by Dr Jan Marco Müller, Head of the Directorate Office and Coordinator for Science to Policy and Science Diplomacy at the International Institute for Applied Systems Analysis (IIASA). To a full room, the panellists provided plenty of thought-provoking content to challenge both sides of the 'post-truth' debate.

To lead off, Dr Müller illustrated the role of trust in lubricating the system between evidence, and policy, and the science advice brokerage required for the two disciplines to effectively interact.

The critical nature of honest (and trustworthy) brokerage of science was the perfect introduction for Dr Roger Pielke, from the University of Colorado at Boulder, and author of the science advice handbook, *The Honest Broker*.

In recent years, a great deal of noise has been made about 'post-truth' and the scepticism of experts, yet as Dr Pielke reminded the group: "We live in a golden age of science advice."

"There is a lot of talk that our world is anti-science or the public has turned against science, and I guess I would reject that assertion completely."

"There are a lot of indicators that the world is taking science and evidence seriously and making decisions that have had positive outcomes."

He does note a number of global headwinds, including the rise of authoritarian politicians around the world, and the dramatic polarisation and politicisation of some issues, such as drug and climate change policy. He also referenced some of the work of Thomas Piketty that indicates an increase in like-minded political views, resulting in greater homogeneity of opinion. Each of these weaken the science advisory process.

In order to strengthen outcomes Dr Pielke posed three questions:

- Can we improve formal advisory processes to better support policy outcomes, rather than just policy intent? He uses the release of the IPCC 1.5-degree report as an example. The report did not offer any options to act upon the information within it – so the report generated a great deal of enthusiasm, but not necessarily policy debates.
"So, improving our formal advocacy processes might mean moving from arbitrating scientific questions to going towards policy options which is difficult, messy and political but sometimes policymakers don't know what to do."
- Can civil/scientific society step in when the government advisory processes are ignored or mishandled? He evidences the situation in the USA and suggests that shadow advisory processes might be effective, if they are possible. This point directly foreshadowed the excellent presentation from Michael Halpern that would take place on Day 2 of the conference (Plenary III)
- Can we as a community escape the siren call of partisan politics? When the weight of numbers is against you, what can be done by the science community to amplify the influence of evidence?

The next speaker, Dr Rebekah Widdowfield, Chief Executive of the Royal Society of Edinburgh, agreed with Dr Pielke that claims scientists had lost the trust of the public are potentially overblown, and that the assumption needed pulling apart and clarification.

Making policy is hard, she said, and providing advice for policy is just as difficult.

"Governments often come into power with very ambitious commitments and the wicked problems, entrenched issues that are very difficult to resolve...They often have multiple objectives requiring choices to be made."

"There are challenges around simplifying complexity. The world is complex and people are complex, so how do we make that world accessible to the policy community?"

A great deal of noise has been made about 'post-truth' and the scepticism of experts, yet as Dr Pielke reminded the group: "We live in a golden age of science advice."

She also emphasises the contested nature of science and policy individually, and that unless advice is done in the right way, these complexities can end up compounding.

To minimise these risk, the art of science advice comes down to a few basic tenets that we still manage to get wrong: Build relationships; Communicate effectively; Manage uncertainty.

These basic principles can then be supported by other initiatives to build a holistic approach.

“We need to engage the public. We need to be careful not to be dismissive of people and seeming to suggest implicitly or explicitly that people are ignorant or simply ignoring the evidence. People are often at the sharp end of science.”

It is also important to realise that your evidence may not chime with someone else’s experience, so having that direct engagement better enables scientists to address people’s concerns.

“And then finally, understand democracy...As a policy official in government my job was to give ministers the best possible advice. Whether they chose to take that advice was their decision and they will held accountable for that at the ballot box.”

Ms Motoko Kakubayashi, Press Officer at the Kavli Institute for the Mathematics and Physics of the Universe, then continued the discussion on effectively engaging the public in matters of science.

Having moved to Japan from New Zealand, she initially considered Japan to be almost a science utopia, with a very high level of trust in scientists and science. But following the 2011 Fukushima disaster, she watched in real time as the country’s trust in experts eroded.

“It dawned on me that Japan was a science utopia not because there was a perfect relationship between science and the media but because most, if not all, these scientific issues... had been carefully prepared with a lot of discussion to come up with one view, one message for the media and therefore to the public.”



“But in an uncertain environment and in emergency, science couldn’t provide the advice that people demanded and the price of that was losing trust.”

I am a scientist. Am I humble and modest? Can I be humble and modest given all the expectations of the funders, or our governments ...our peer reviewers...the public?

Part of her work now entails asking scientist and technologists to imagine what steps they might take in an emergency to ensure that the right scientific evidence was reaching the right people; should you use the media or should you use a different channel?

This is a great exercise in having scientists think about how to explain uncertainty, and the limits of science, and to consider the potential impacts of their research on the world.

“There needs to be a dialogue with a variety of stakeholders, not just once but regularly, because it is the nature of science to constantly evolve and change.”

The next to take the floor was Prof Janusz Bujnicki, Member of the European Commission’s Group of Chief Scientific Advisors.

“Many scientists, including me, are quite arrogant,” he began. “So, what about antonyms of arrogance? Humble, modest.”

“Well, I am a scientist. Am I humble and modest? Can I be humble and modest given all the expectations of the funders, or our governments whom we are supposed to advise, expectations of our peer reviewers, and what about expectations of the public?”

As well as trust, there should be a discussion about trustworthiness, he insists. Trustworthiness is more than a demonstration of competence and character, it requires the ability to really listen.

“And scientists are never trained to listen, and they are usually very bad at listening. And I think being a good advisor actually requires 100% attentive, humble and responsible listening.”

Before jumping to conclusions and solutions, Prof Bujnicki suggests, it is important with policymakers and the public to talk and demonstrate less, and to listen more.

The last presenter was Ms Tracey Brown, Director of Sense About Science. The work of Sense About Science focuses on promoting the public interest in sound science and evidence, mobilising the public on campaigns that often directly target policy-makers.

Ms Brown echoed several of the previous speakers in rebutting the idea that we are seeing a crisis of trust emerge around the world.

“The rush to talk about a crisis of trust fills me with horror,” she said. “And the self-delusion of people, who would otherwise be quite rigorous looking at long-term data, [deciding] it seems okay to think about how you feel after a recent election and draw conclusions!”

“We also don’t live in a post-truth society...The bad news though, is that if you want to engage the public you have got to lose something.”

People don’t engage with science or politics to be your fan club, she points out. To be able to change people’s minds might mean being more exposed and showing your reasoning for a policy choice. People get involved when they can see there is something at stake.

“When they can see that there is going to be some sort of footprint on their wider world as a result of caring, then people will move. But they won’t move because you think they need better economic literacy.”

She also called into question the assertion that everyone now lives in bubbles; she points out that we have always lived in bubbles, always surrounded ourselves with people of like-mind. Nothing in her experience indicates that we live in a post truth world, she says.

“The danger in all this is that if people in the policy world and particularly if politicians start to think that that’s the gallery they are playing to, then we will have even further loss of leadership on some of those difficult issues.”

“If we start to think the public has no tolerance for difficult discussion of this nature then we are going to see even more of a drop down.”

The Q&A session provided a varied and wide ranging discussion across transparency, democracy, and listening to the public. One of the key points was to appreciate how much the nature of science advice has changed and evolved, and increasingly has to balance advocacy alongside honest brokerage.

In addition to this, there is greater need for transparency of decisions and methodologies as well as historical memory so that the same advice is not being put forward again and again.

People don’t engage with science or politics to be your fan club...People get involved when they can see there is something at stake

PARALLEL SESSION 4.1

Dealing with Disaster – The Role of Science Before, After, During

Science advisors and science advisory mechanisms typically do not crossover into the role of decision makers. However, in quickly evolving crises, the lines can be blurred. The stages of a crisis require distinct types, timing and packaging of advice, all of which also depend on the issue at hand.

Session Moderator, Prof Abhi Veerakumarasivam from the Department of Biotechnology, School of Science and Technology at Sunway University, began the session by emphasising the drastically different timescales that science is required to work at when faced with a crisis.

Generally, the advice that science offers to policy is for long-term effects, such as in climate or healthcare. Yet in the wake of a crisis, the solution that science needs to provide are almost urgent; how does this sit with the slow, deliberate process of research?

The first to tackle the topic was Dr Anne Bardsley, Associate Director of Research at the Center for Science and Policy, Diplomacy and Society at the University of Auckland.

Working in the office of the previous Chief Science Advisor to the Prime Minister of New Zealand, she was involved in the process to improve the input of science into the country's emergency management system, and also was involved in the OECD working group on international cooperation in science advice relevant to crisis management.



“We also conducted a workshop with science advisors and crisis management experts to practice these [advice mechanisms] and look at where the gaps were first during the times of crises,” she said of the OECD report.

“The bottom line of this was that each country needed to be able to identify who or what institution was going to be the point of response to a crisis where information might need to be shared.”

We need to build trust, so in times of calm these mechanisms need to be solidified so that people know where to go to

As well as having national structures in place, it is also critical to be able to link emergency mechanism to international sources and to be able to deal with this additional information.

“We know it's that the WHO for public health emergencies, WMO for meteorological crises, and the Disaster Risk Management Knowledge Centre and other bits of the JRC for information on a global scale. But it's also whether the countries have the capability to take in that information and know how to use it.”

“One of the main issues is advice sharing across borders. We need to build trust, so in times of calm these mechanisms need to be solidified so that people know where to go to,” Dr Bardsley concluded.

Dr. Elizabeth Silvestre Espinoza, Vice Director of Research at the Universidad Católica Santo Toribio de Mogrovejo, was next to speak, and she emphasised the work Peru has done in developing models to deal with various disasters.

As a meteorologist, one of Dr Silvestre's main areas of work is on climate resilience of farmers.

“Two things that have major impact in Peru, is the El Niño - that is a global phenomenon - and also the impact of climate change mostly on the agriculture. Ninety five percent of our economy is dependent on agriculture.”

In dealing with the people at risk or affected, it is important to understand the scientific, technological and also social aspect of the situation. In gathering information, the social element is key when dealing with people who might not have scientific or technical expertise. And dealing with a situation high in the Andes is very different from dealing with a situation and affected people in the Amazon.

“Another point is: we need to guarantee that the information is coming in real time. Real time for us, in an early warning system, is in working in the time of seconds,” she said.

Next to take the floor was Professor Haruo Hayashi, President of the National Research Institute for Earth Science and Disaster Resilience (NIED).

“The mission of NIED,” Prof Hayashi said, “is to promote the level of science and technology for disaster risk reduction and resilience by conducting two types of studies, basic studies like the academic institutions, plus fundamental research and development.”

“We are focusing on three fields. First one is detecting threat, and then second is visualising threat, and then third one is improving resilience.”

After taking the Presidency of NIED, Japan suffered an earthquake at Kumamoto. NIED responded by sending researchers and administrators to the site to create an operational picture of the situation by compiling all the relevant information. They then could communicate this picture to the people requiring it.

The system has been utilised since, most recently for large-scale flooding and another earthquake, and the NIED team were onsite to provide various kinds of briefings.

“And then, because of this, our national government set up a so called information support team within the framework of the national response system. In addition to the government officials, our researchers from NIED have been designated as one of the key members to provide this kind of information service for all the stakeholders,” Prof Hayashi concluded.

Next up was Dr Meghnath Dhimal, Chief Researcher Officer at the Nepal Health Research Council, and he began with a startling statistic: In the decade from 2005 to 2015, a total of 3583 disasters occurred.

“And this figure is four times higher if you compare it to the 1970’s decade. And nearly 85% of these disasters occurred in Asia...[affecting] 1.7 billion people.”

“The cause of climate change is from developed countries and yet its effects are disproportionately high in the least developed countries or low and middle-income countries, inviting an ethical crisis,” Dr Dhimal said.

“More than 80% of the total population of Nepal is at risk from natural hazards such as floods, landslides, windstorm, hailstorms, fire, earthquake, and epidemics of disease. And the country is ranked among the 20 most disaster prone countries in the world.”

The 2015 earthquake that killed almost 9000 people in central Nepal provides a potent case study. Following the earthquake an effective health response is critical, as demonstrated by the Haiti earthquake where cholera caused more than 10,000 deaths after the incident itself.

Within an hour of the quake, officials including Dr Dhimal, met with the Health Minister at the Health Emergency Operation Centre to evaluate priorities and response. This Health Operations Centre was linked with National Emergency Operation Centres, all hospitals and district health offices, to also track the number of casualties, injuries and to refer or provide people with health services accordingly.

From 2005 to 2015, a total of 3583 disasters occurred...this figure is four times higher if you compare it to the 1970’s decade. And nearly 85% of these disasters occurred in Asia

Have open data, open methods and be transparent about what you do. Avoid black boxes

One of the tasks of this Health Emergency Operation Centre was to effectively mobilise and manage the 137 medical teams that arrived from 40 countries, including the regulation of malpractice during the crisis.

“In order to prevent the epidemic of disease, we strengthened the syndromic disease surveillance and expanded early warning and response systems; and dead bodies were managed as per the dead body management guidelines.”

“What is the lesson learnt? Intensify surveillance, early response with good multi-sector coordination and collaboration. We could contain the outbreaks and we averted deaths, with further deaths being zero.”

“Adopting a multi-hazard approach to disaster risk management that includes epidemics and other biologic hazards is very important...Managing the health effects of disaster and climate is also very

crucial,” Dr Dhimal believed.

Finally, the session moderator, Dr Veerakumarasivam, challenged the last speaker, Dr Tom De Groeve the Deputy Head of the Disaster Risk Management Unit for the EC’s Joint Research Center, to try and tie together the lessons of the session.

“Very important in this area of disasters is the principle of subsidiarity and the golden rule is to manage the crisis as local as you can and as global as necessary,” Dr De Groeve began.

And as responses to crises escalate from local, to national, to international, it is important to ensure that there is a shared knowledge base, and that each new organisation shouldn’t be starting from a different understanding of the situation. It also needs to be appreciated, he said, that now there is an abundance of information and that supplying all possible information, is not necessarily helpful in a crisis. The right information at the right time, is key.

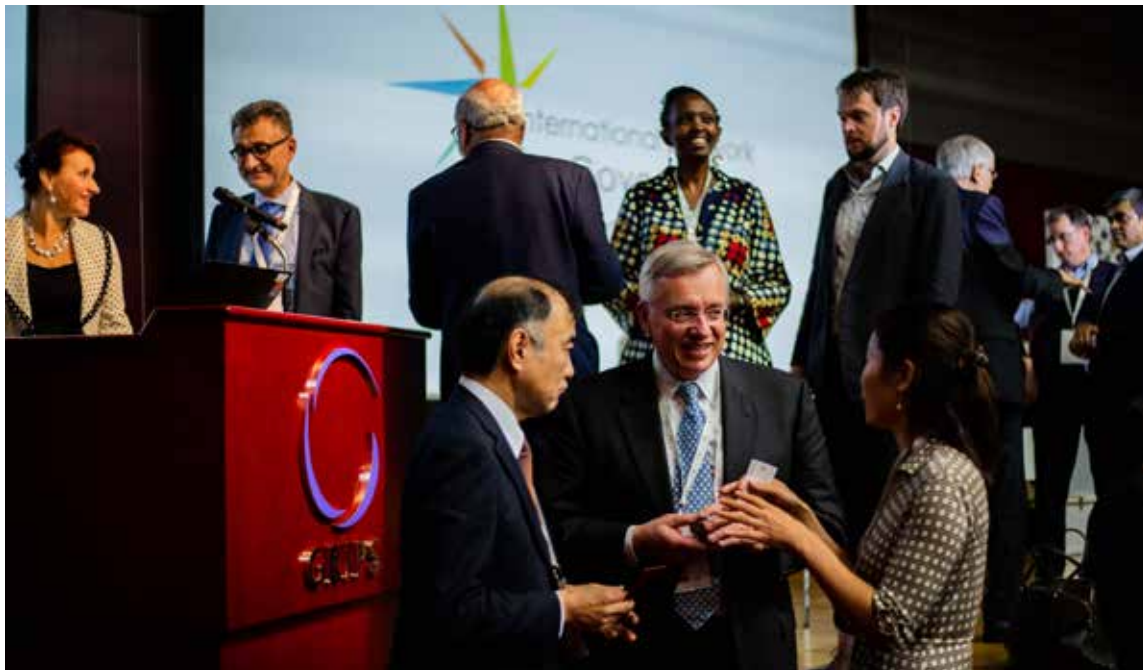
“Providing science is not a trivial task. You have to convert what you know in detail, to a message that is useful in the context of the people that are working. So, narratives work...the three questions typically are: what’s happening, what is the impact to people and what should I do?”

You also need to be aware that nobody will blindly trust your science advice, he warns. The response to your work will depend on factors such as your relationship and history of advice with the recipient; which is why exercises and training can help in advance of a disaster.

“Have open data, open methods and be transparent about what you do. Avoid black boxes.”

The Q&A addressed questions relating to public-private partnerships in developing models of response, the role of trust and the repercussions of a loss of trust, the lessons and the risk to countries in the Pacific, and localisation of disaster response.

Nobody will blindly trust your science advice...The response to your work will depend on factors such as your relationship and history of advice with the recipient



PLENARY 2

Socio-Techno Transformation and the Global Goals

The Sustainable Development Goals require both technical and social innovation if they are to be realised. From municipalities to multi-laterals, all jurisdictions in all countries have a role to play as these goals are not a traditional 'development issue'. Chaired by Dr Connie Nshemereirwe, Co-Chair of the Global Young Academy, the session explored the types of innovations taking place right now, or those that are planned in the near future, to help realise the goals. What can we learn from each other? How is the science community, industry, and government engaging?

Leading the session, Dr Nshemereirwe underscored the rapid rate at which social and technological systems will have to move in order to achieve Agenda 2030 by the deadline. The paradigm shifts in how we live, work, and do business will not be universal, they will need to be nation and context specific, while still meeting the complex targets of the SDGs.



Despite the majority of technological advances emerging from the private sector, often private enterprise is absent from any national policy on achieving the SDGs, began Dr Haruo Takeda, Corporate Chief Engineer at Hitachi Ltd.

Japan is the exception, he noted, where the corporate leadership of Hitachi has been a part of the national and trans-national effort to achieve the SDGs. Yet despite this arm's length separation between industry and development, Dr Takeda indicated that it is still the case that "every science will go through industries in some form before it contributes to the SDGs."

And the processes whereby technology moves linearly from research to industry and then onto society are too slow to meet the 2030 goals. This makes "innovation in collaboration among academia, industries and the government, indispensable for achieving the SDGs," he asserted.

Using Hitachi as an excellent example, Dr Takeda illustrated industry's need to not only react to economic drivers, but to create whole new markets to stay relevant and profitable. It highlighted the fact that industry is in the business of paradigm change. Even though the private sector moves at a vastly different rate to academia and government, the dynamic force of industry is a powerful tool to be utilised when reshaping how we live.

Emeritus Professor Michael Barber was the next to take the podium. As an Executive Committee member of the Australian Academy of Sciences and a member of the IAP Expert Committee to Enhance Global Science Advice for the SDGs, Prof Barber was quick to warn about the risks of techno-optimism.

"STI is important, indeed essential, to advancing almost all the goals," he said. "But alone it will not deliver any."

"I'd like to comment on something we don't really talk much about: and that's technology's social licence to operate. After all, if there is no social licence to operate then I think it is a little ambitious to say that technological solutions will be readily accepted."

"While the reach of modern technology is essentially global, its acceptance is local."

In what was an obvious trend across the panel, and in the Q&A session, there is a growing uneasiness about technologies ability to solve large issues without there being serious unintended consequences.

Prof Barber referenced The Digital Society Index 2018 survey by the Dentsu Aegis network and Oxford Economics. The survey asked 20,000 people in 10 countries whether they believed that digital technology could make the world a better place by helping solve the biggest problems of our time.

"The results are rather interesting," Prof Barber summaries. "Only in China did a majority 78% answer 'Yes'. The average across the 10 countries was 42% with the US at 38% and Australia at 40%."

Other than this element of trust, social licence also depended on ethnic, religious and cultural implications for the adoption of technology, and the framing of effective policy and regulation. By running parallel studies around the world, and comparing the results, global and national policy priorities will be better informed by regional contexts.

Industry is in the business of paradigm change...the dynamic force of industry is a powerful tool to be utilised when reshaping how we live.

Prof Barber, in this vein, suggested the need for more information sharing about projects. “I’m afraid that my recent 2-3 years engagement with the UN system, and strategies, and global roadmaps etc, has disillusioned me in some ways,” he said.

“On the converse, I actually think that the SDGs have stimulated – what I’ve called elsewhere – a million flowers. My concern is that those experiments...we don’t know about them, we don’t learn about them, we don’t cross the barriers, we reinvent the wheel.”

We need well-designed pilots that explore, not just technical feasibility, but the social, cultural and regulatory issues involved in wide-spread adoption

Yet, he also warned about the risk of projects being rebadged to support the SDGs. “Too many of the projects that Science, Technology and Innovation put up as contributing to the SDGs are technology push, or projects that weren’t really devised in the context of the SDGs.”

He suggest a set of criteria by which projects should be devised and judged so that should they be listed on a platform or database, where the depth of their functionality for the SDGs could be more easily appraised.

“Any [project] proposal needs to meet three criteria. It must address a real problem with clear, preferably measurable, outcomes that advances at least one SDG. It must analyse how that advance impacts upon the other goals with a particular focus on the mitigation of detrimental effects. Finally it should indicate how that intervention might be trialled so that scale-up is enhanced and the cultural and social issues that might potentially derail adoption are explored.”

“We need well-designed pilots that explore, not just technical feasibility, but the social, cultural and regulatory issues involved in wide-spread adoption,” Prof Barber concluded.

The topic of information sharing was central to the presentation of Mr Xavier Estico, CEO of the National Institute of Science and Technology and Innovation (NISTI) of the Seychelles.

Though Africa’s smallest country, the Seychelles have taken a progressive stance on the dissemination of data between academia, government and society, by developing a platform for diverse information sharing.

With a population of only 100,000 the country faces a number of challenges across policy, legal frameworks, infrastructure, foreign investment potential and human capital.



The digital platform – the NISTI Knowledge Engagement Platform Architecture – circumvents these challenges by utilising Open Source technology where possible, cloud computing, and agile deployment rather than lengthy implementation schedules. The platform is available over all devices and aggregates a suite of datasets across a growing range of sectors including farming, fishing and education.

The benefits of the platform have been improved productivity, encouraging collaboration and increased user engagement, preventing knowledge loss, enabling better and faster decision making, stimulating innovation and growth and improved analytical data and reporting.

Following on from this success, NISTI were asked to develop a platform for the Africa Union, which resulted in the NEPAD/AOSTI Platform to which Individual African Countries integrate, or manually upload, datasets to the platform.

“This will help our region, our continent,” Mr Estico said. “I know in the SADC [South African Development Community] region we are looking at harmonising our STI policy, so we will be conscious of what is happening in our member states and also sharing our experience and resources to improve our R&D and Innovation.”

While Mr Estico provided a concrete example of digital innovation roll-out, Ms Kay Firth-Butterfield, the Global Head of AI and Machine Learning at the World Economic Forum, warned that we shouldn’t ignore foundational principles in the rush for high-tech solutions to the SDGs.

“We need to create firm foundations because if we don’t then we will lose the trust of those people who we might be able to help with artificial intelligence,” said Ms Firth-Butterfield.

With digital technologies there are number of key issues that must be foremost in mind, to maintain trust - Accountability, Transparency, Bias and Privacy. To achieve this she offered a number of suggestions:

- **Every country needs a national AI strategy**

Without a national AI strategy you really don't have a roadmap to decide what you want to do with AI, where you want to buy it from, and how you want to train your population for it. If countries don't adopt national AI strategies and actually put some thought into their work, then they will end up as vassal states to the US and China – the states that are leading in the AI race – or potentially as vassals to the big companies that dominate AI in both those jurisdictions.

- **We also need to educate our scientists**

"We don't want to only be looking to Japan for scientists who actually understand social impact. We need to be thinking about how the AI scientists that we create, or grow in our territories, also understand about social impact."

She paraphrases Mustafa Suleyman, co-creator of Google DeepMind, in saying that one of the big problems facing AI is that most of the brilliant minds are thinking about how to sell more fizzy water, as opposed to how to sell or develop clean water.

- **Consider those firm foundations**

A great deal of thought needs to be put into identifying and addressing potential unintended consequences. Ms Firth-Butterfield points to education, and a project that the WEF are undertaking with UNICEF that looks at AI-enabled toys to educate children.

"Unless you put some firm foundations in, what are we going to do about the children's data...that is sucked up by these devices? Is it going to be monetised, do our kids ever get the data back, what is the actual education that our kids are receiving?"

"What about children's creative play, if they're no longer dealing with an invisible friend, or creating tea parties for their dolls, what are we actually doing to their creative play? Are we increasing their creative play or are we decreasing it? And does it matter?"

Predicting Transformation

The issue of unintended or unforeseen consequences was raised, in kind, by Dr E. William Colglazier, Editor-in-Chief of *Science & Diplomacy*.

"When I was the science and tech advisor to the [US] Secretary of State, I interacted with her intelligence agencies trying to anticipate what were some of the things that might come from technology, what future world might we expect?" Dr Colglazier recalled.

"I have to admit that we did not anticipate the use of social media; we were worried about cyber intrusion actually getting into voting machines, we didn't realise it would be hacking people's minds and hacking our democracy." Yet as important as it is to be cautious, he also warned that failing to make the most of the opportunities of disruptive technologies could even be more costly.

"The one remarkable thing about science and technology: it can provide new solutions that leap over diplomatic obstacles, over political obstacles, and sometimes offer solutions that were invisible before." Key to formulating the right response to the risk/reward of STI for SDGs, were detailed roadmaps, not only at the national and global levels – as championed by Klaus Tilmes and Michiharu Nakamura in Plenary 1 – but to have these roadmaps in place at the sub-national, city level, and even institutional level.

Dr Colglazier also highlighted two major reports. One was *From the Lab to the Last Mile: Technology Deployment Business Models for the SDGs* from the Global Solution Summit, which emphasised the practical deployment of existing technologies for the SDGs.

The second was *The World in 2050* report from IIASA, which coalesced around six big transformations that were required to achieve sustainable development in the long run – and beyond Agenda 2030.

Following the presentations, the plenary panel were engaged upon a diverse range of questions that echoed the concerns about rampant, unprepared adoption of technology, the winners and the losers. These included questions on:

- Whether there was too much focus on the future, and not enough on connecting technology to the now;
- The concern that despite techno-enthusiasm, human wellbeing might not be benefited by new technology;
- The imperialist attitude towards labour being replicated in 'digital sweatshops' and how to protect against entrenching inequality in these new systems;
- And the 'pacing problem' of technology outrunning lawmakers, judges, politicians and society.

KEYNOTE 2 – DR VLADIMÍR ŠUCHA

Director General of the Joint Research Centre of the European Commission

The European Commission has been a longtime collaborator and supporter of INGSA, with close ties between the network and the Joint Research Centre (JRC). INGSA2018 was therefore grateful to have Dr Vladimír Šucha, Director-General of the JRC in attendance to provide a keynote.

The talk perfectly encapsulated one of the many themes of INGSA2018: that the nature of science advice has evolved rapidly – even since INGSA’s first conference in 2014 - and that the field has to put energy into trying to predict what science advice will need to look like in the future.

For Dr Šucha and the JRC, this vision of the future has been dubbed, Science for Policy 3.0.

Where have we come from – Science for Policy 1.0

Dr Šucha began by relating a story about a foggy day and a man in a hot-air balloon calling for help – ‘Can you help me? I’m lost!’

A man on the ground offers help by telling the hot-air balloonist that he is at exactly 45 degrees, 25 minutes, 29 seconds North and 75 degrees, 42 minutes and 20 seconds West.

The balloonist’s exasperated reply is: ‘You must be a scientist, because I’m asking you a simple question and you’re answering in an extremely complicated way and I’m still lost.’

To which the man on the ground replied: ‘You must be a policymaker because I’m giving you an exact answer, you’re still lost, and you’re blaming me.’

For Dr Šucha, these sort of interactions typify Science for Policy 1.0 – in which the evolution of science policy interactions could best be described as moving from ‘collision’ to ‘interaction’.

“It is from throwing a big thick report full of 50 or 100 recommendations for policymakers, to something which is completely different and completely new,” he said.

Science-for Policy 2.0, where the world is now, grew from the appreciation that scientists’ and policymakers’ minds are wired in different ways, that the lifecycles of each are vastly different and that the world provides an increasingly complex backdrop to these interactions.

Where are we now – Science for Policy 2.0

For the JRC, effective science advice for policy is about Integration, Co-creation and Co-production.

“[Science Advice] cannot be done at a distance, it cannot be done from institutions which have nothing to do with the policymaking, it cannot be done without this intimate interaction in a safe space, where the policymakers are not exposed to criticism or failure or losing of their face if they do something in the wrong way,” Dr Šucha insists.

“We co-create because very often the policy question is not the research question. And the research answer is not the policy solution.”

Yet even though science advice is considerably more sophisticated and embedded in organisations such as the European Union, Science for Policy 2.0 still faces a number of challenges, including the digital age’s Cambrian explosion of information, data and knowledge. For policymakers, trying to make sense of all the possible information, without a mechanism to assist, is akin to trying to drink from a fire hydrant.

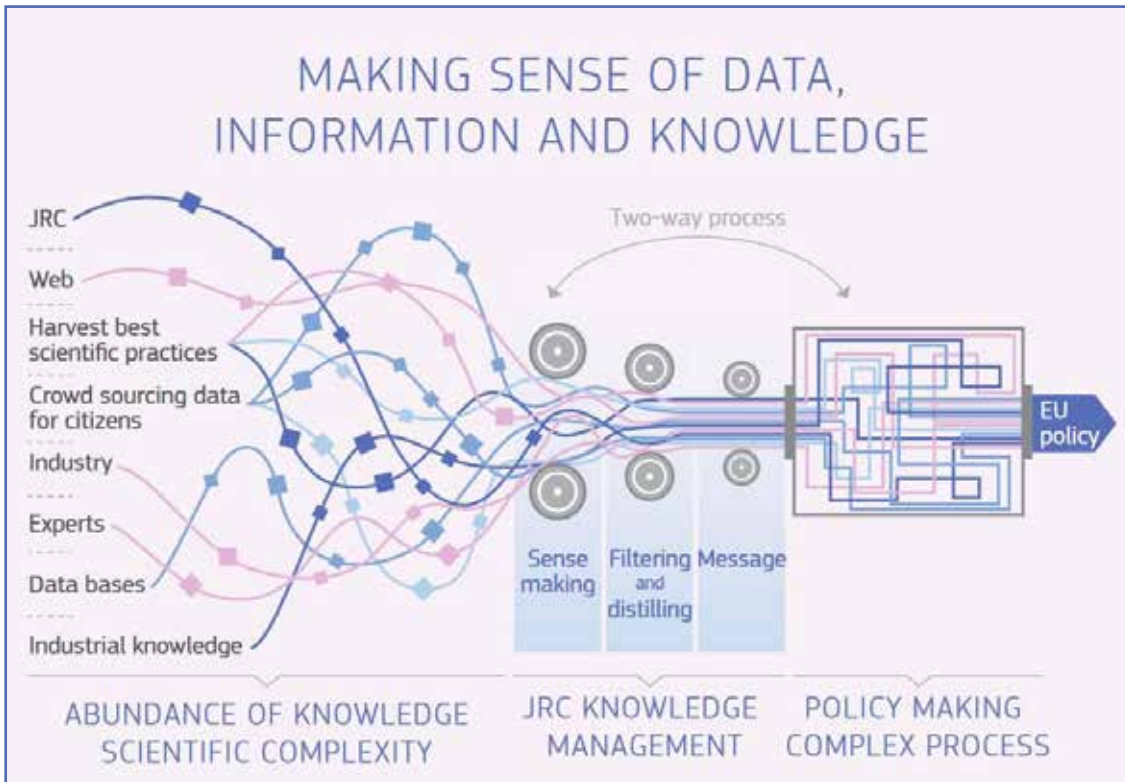
Very often the policy question is not the research question. And the research answer is not the policy solution

Knowledge workers are the second in line to disappear if they don’t change how they work, how they operate

“You need to have someone who is digesting, who is selecting, what is important, out of this ocean of data... It is only if we create communities of knowledge, because nobody, even an organisation, is able to know everything,” said Dr Šucha.

“We need to know who knows, and this is the way that we will increase, in an exponential way, our cognitive capacity, so that we can compete with artificial intelligence, with technologies.”

For Dr Šucha, one of the key roles of this science/policy interaction is this knowledge management and he asserts that universities and research institutions will have to increase their role in this, unless they want to be replaced, as bloggers and social media replaced traditional media.



“Knowledge workers are the second in line to disappear if they don’t change how they work, how they operate. So the role of knowledge management is crucial for all knowledge-based organisations, but it’s absolutely crucial for the science organisations interacting with policy.”

In the face of rapid technological change and the explosion of data, we need to create these communities of knowledge with the knowledge workers and policy-makers as well, and with civil society and citizens at large. The JRC has found that this process completely changes how science and knowledge is perceived by policymakers. Likewise, it has changed how policymaking is perceived by the scientists.

At the JRC they are already creating virtual knowledge centres to bring together expertise and to manage knowledge. This takes the form of thematic, vertically-integrated knowledge management, as well as horizontal knowledge management that refines scientific competences that can be applied across issues and benefit all policy outcomes.

Dr Šucha identified other big challenges threatening the effectiveness of Science for Policy 2.0: the issues around explaining uncertainty and risk; the crisis of science and the silo effect that limits cross-discipline collaboration.

“Then we have this big crisis of reproducibility in science. This big issue where the scientometry is becoming our obsession and is becoming a bit perverse.”

“Another element that is out there is the lies...never before have different liars and alternative people with alternative facts and alternatives agendas had so much space and so many communication channels as they have right now,” Dr Šucha mentioned.

We need to understand where the power is, because we are used to having the governments responsible for almost everything, but now it’s not true

Where are we going – Evidence for Policy 3.0

Just as science advice evolved to become a multi-facet, multi-stakeholder, co-creative endeavor, if evidence and knowledge are to maintain their currency in policymaking, the field will have to continue to adapt and change.

Already the JRC is looking towards what they call Science for Policy 3.0, and the paradigm changes required to get there.

“First we need to understand where the power is, because we are used to having the governments responsible for almost everything, but now it’s not true anymore,” warned Dr Šucha.

“There are many different players, multinational players, networks that are influential and are setting the agenda of different national states, so it’s not anymore in the hands of the government. And this is part of our problem. Even if the government is very much interested in having the evidence, using the evidence, they do not have the influence.”

Another major consideration is the tendency for policymaking and science and knowledge to be undermined or hijacked for political reasons, breeding public scepticism in science and its proponents.

“We have this big phenomena of emotional charging of the evidence, that in spite of the figures, in spite of the facts, in spite of the numbers, we are not changing the mind of some people.”

Enlightenment 2.0 – the integration of emotions and human values to complement the pure reasoning that was introduced in the Age of the Enlightenment

“We have been saying for quite a long time that science is dealing only with facts, but we need to move a little bit more to emotions and values, we need to understand scientifically about how the emotions and values are being formed, how they are altered.”

“All these three factors – Facts, emotions and politics – is altogether creating policy.”

This multivalent approach across science, the human element, and policymakers echoed strongly with many of the discussion across INGSA2018 on the role of the social sciences and humanities in deepening the understanding and acceptance of science advice.

For the JRC, this element of Science for Policy 3.0 has been called Enlightenment 2.0 – the integration of emotions and human values to complement the pure reasoning that was introduced in the Age of the Enlightenment.

“We see clearly that only reasoning, only facts, only rationality, is not able to explain all the challenges which we are facing right now,” Dr Sucha concludes.

For the past few months the JRC have been working on the first stage of this Enlightenment 2.0 project with 70 scholars from around the world, to perform a literature review that will underpin the next steps of development.

They expect this first report will be release in 2019, a key step on the road to science advice’s bright future.



KEYNOTE 3 – PROF RÉMI QUIRION

Chief Scientist of Québec; Co-Chair of INGSA

Day Two of INGSA2018 kicked off with an energising introduction from Prof James Wilsdon, Vice-Chair of INGSA, framing another full day of discussion.

He culminated by introducing the day’s first keynote, Dr Rémi Quirion, Chief Scientist of Québec.

Dr Quirion began by framing the conferences keynotes so far: Ms Helen Clark, from her vantage as an ex-prime minister, offered a perspective on high-level and international leadership; likewise, Dr Vladimír Šucha detailed the mechanics of science advice at an EU, transnational level.

For Dr Quirion it was therefore important to augment these perspective with what it was actually like at a local level – “You’re appointed as Chief Scientist – What do I do next?” he proposed.

As a Federal Parliamentary democracy, Canada devolves a lot of responsibility and independence to the provinces. Québec spends the highest rate on R&D in the country and fosters industries such as clean energy, AI, aerospace and health research.

The position of Chief Scientist in Québec is a bit different to many models, including the mandate to advise ministers, engage internationally and to promote scientific literacy and partnerships with civil society and elected officials. The role also chairs the board of the three main research funding councils.

As well as brokering advice, Dr Quirion’s role also encourages the promotion of science and scientists to policymakers, for example, coordinating a series of very successful scientific breakfasts where the topics are guided by what policymakers want to engage with.

Dr Quirion’s office is also public-facing, providing resources and outreach via a range of modes, including the website, Facebook-Live consultations, Participatory Citizen Science Projects, and partnerships to provide a ‘Fake News’ fact-checking resource.

As well as managing these domestic priorities, Dr Quirion is mandated to promote a strong international presence for the province.

“Québec is small,” he said, “so we want to make sure that we increase the impact of what our research community is doing. So brokering a lot of relationships at the international level, lots of partnerships of Quebec’s Premier’s Office with UNESCO, EU, West Africa etc.”

Do not let facts speak for themselves: You assume that when you talk with a high-level policymaker, they will talk to the deputy minister...More often than not, it does not happen. Do not take anything for granted



“One thing we have just started that we will try to expand, is international fellowships for local PhDs. They are finishing their PhD, they are thinking about a different career so we offer them a fellowship, a training in a Québec office abroad...a great chance for them to learn on the ground about science advice to elected officials.”

One particular collaboration of note was between Québec and Massachusetts Collaborative Research Council – to lead a work program around climate change, after high-level political issues made it obvious that change was becoming harder at the federal level and that it was up to state level actors to drive progress.

These international agreements underscore the incredible value of Science Diplomacy for a role such as Dr Quirion’s and a government such as Québec. He provides the example of an agreement with the Palestine Academy of Sciences and Technology, which has since welcomed 30 young researchers to universities in Québec. It has helped the province to establish diplomatic links in a low profile way.

“But Africa will be more and more of a partner of ours. The future of the francophone community is not in Québec, it’s not in France, it’s not in Belgium, it’s in Africa, so we have to work with colleagues in Africa and work together.”

“[With INGSA] we had an event, a workshop in Dakar, in 2017, we’ll have another on in Burkina Faso [in 2019], and others are coming. It is always extremely stimulating to exchange ideas with these young people all over Africa. We are learning from them as much as they are learning from us.”

Québec is also involved at the level of the G7 on Arctic Research, developing an integrated research network on climate change that includes First Nations living in the north.

Dr Quirion concluded by imparting the key lessons he has learned in his years in the role:

- Trust: “You need to have the trust of your boss, of course, of high-level policymakers, deputy ministers...And, for me at least, more often than not, it is being a phone call away.”
“They rarely ask for a long report, these days. It’s more they call us – ‘Can you give me some advice for the next few days on the following topic?’”
- You are the advisor – you don’t make the decisions: “Often it’s hard for scientists who think that they know best, so you have to learn to change your mentality.”
- Understanding the decision making process: Science is only one piece of the puzzle.
- You have to have supporters, you cannot be a loner: “You have to have a crowd of supporters at various levels of government that will help you in your day job.”
- You have to build capacity: “We talked about Africa. I will tell you that in terms of capacity we do not have that much more capacity in Quebec than in many other places in the world, we still need to think about building capacity and INGSA schools are a great way to do that.”
- Do not let facts speak for themselves: “You assume that when you talk with a high-level policymaker, they will talk to the deputy minister and the deputy minister will talk to the minister. More often than not, it does not happen. Do not take anything for granted. Do not let the facts speak for themselves.”
- Scientific credibility at home: Scientific credibility is very important both with the politicians, but of course with the scientific community. And it is critical to have it locally, otherwise it is hard to build credibility nationally and globally.
- Be resilient. “Your boss will change regularly and you have to get used to it...I’m at Premier number four, three different parties, 7 ministers. But that’s part of the game and you’re lucky if you work with them for more than a couple of years.”
- Regional and municipal government are the key to success: More and more, it is local and regional governments that will be the key ingredient to success.
Civilians want to be involved: And they are more easily engaged at the level of cities and municipalities.
- Exchange Best Practice: Make sure you exchange best practice with colleagues around the world. That is part of the reason networks like INGSA are so important.

Scientific credibility at home: it is critical to have it locally, otherwise it is hard to build credibility nationally and globally.

PLENARY SESSION 3

Science Advice at multiple levels – from local to global

All public policy at all levels should be evidence informed, but especially regarding the SDGs. This is because the SDGs, by definition, will require a sustainable and coordinated global effort to achieve, but there is rarely easy consensus on the best way forward especially where a perceived solution will have trade-offs and implications.

In these circumstances, evidence, honestly brokered, can be an arbiter and help point a direction toward consensus. Can knowledge brokers from multiple levels play a role in developing consensus? Under what conditions does this work or not work? How are power dynamics dealt with across levels and jurisdictions? Can science play a bridging role?

The session was moderated by Prof Tateo Arimoto, Visiting Professor at GRIPS, and one of the key organisers of INGS2018. He began by pulling apart the overarching premise of the session, and framing it against the theme of the conference: What are ‘multiple levels’ and what are ‘governments’ in a changing world, in the age of post-truth, in the age of the SDGs?

Mr Alex Harris, the Head of Global Policy at The Wellcome Trust, was the first to take the podium and provided insight into the role and goals of an international research funder. Being both politically and financially independent, The Wellcome Trust takes a global approach to supporting scientists and researchers to take on big problems, last year distributing ~\$1.5 billion to about 14,000 researchers in 70 countries.

“As a large funder of science we are naturally keen to make sure that the very best science is used in policy making,” Mr Harris said. “And the SDGs provides an excellent opportunity to focus our work to address some of the challenges at local, regional and global levels.”

He presented five key conditions that Wellcome believes are necessary for the link from evidence to policy to thrive, and that they are actively funding:

1. **Access to knowledge**

“We have to do all we can to ensure that research findings are freely available and shared widely at the time of publication. Wellcome has felt strongly for a long time that this can only happen through Open Access.”

Mr Harris illustrated this by pointing to Wellcome’s recent announcement that they will join cOAlition S, along with the Gates Foundation, to push for full and immediate Open Access research publications.

“There’s much useful evidence that could be used to build effective plans to tackle SDGs,” he said. “But the access to that evidence is fragmented or there’s simply very low awareness of the research.”

2. **Shifting the centre of gravity in research**

Open Access to research feeds directly into his second point – that stronger links between evidence and policy will be possible if research is enabled to happen locally. “We need to build local research capacity and capability to shorten that chain between evidence and policy.”

Wellcome also recognises the need to empower these researchers to become leaders who can go on to influence policy, particularly in respect to developing local actions on the SDGs.

3. **Priority setting from the bottom up**

For Mr Harris, priority setting needs to work from the top-down and bottom-up. Getting that balance right is very difficult. “If we want to talk about, in our case, a particular healthcare intervention, then we must understand that in resource-constrained environments, it needs to be clear what the economic benefits of such an intervention will be.”

4. **Equipping scientists to engage policy makers**

“Policymakers are time poor, they are being lobbied by many interested parties all of the time. We have to make it as easy as possible for them to make the smart decision.... Policymakers are under extreme pressure from new and old sources of influence.”

5. **And taking a multidisciplinary approach.**

“There’s much for us to do, but there’s also much that we can do to improve the link between science and advice and policy for the SDGs. But we need to challenge ourselves and ask what we can do differently; the same old systems won’t work anymore.”

Priority setting needs to work from the top-down and bottom-up. Getting that balance right is very difficult

Following this, was Professor Tan Sri Zakri Abdul Hamid, former Chief Science Advisor to the Prime Minister of Malaysia. After four decades of working in science advice and diplomacy, Prof Zakri provided a sober reminder not to mistake international agreement with local action.

“The more I’m involved with all these [global agreement] processes, the less I know and I’m quite pessimistic of the future,” Prof Zakri began.

Among his many national and international roles, Prof Zakri saw this first hand as Chair of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). IPBES was excellent at articulating the scientific concerns of biodiversity loss to inspire policymakers to take the right decisions, but the processes of IPBES constituted most of the visible action and did not necessarily translate to changes on the ground.

He reminded the audience that the path to the SDGs has a long history, dating as far back as 1987 with UNCED and the Brundtland Commission, all the way through to 2015 and Agenda 2030. All this work at the international level and has anything really changed?

“The question for us would be: How would we translate these global aspirations at the local/national/regional levels?” Prof Zakri posited, offering two examples.



One: Malaysia, during the Earth Summit committed to having forest cover of at least 50% of its land area. The latest figure by the FAO, three years ago, stands at 67.6%, which on paper looks fantastic.

But at the micro level there are still cases where pristine forest has been reduced to a barren moonscape. Breakdown in governance, corruption and division all help to create a disconnect between macro level intent, and micro level execution.

Two: The Transboundary Haze Pollution that swamps cities like Kuala Lumpur. There was an agreement at the Asian level to combat this haze, a result of massive land clearing in the region. In 2002, Malaysia signed the legally binding agreement but the treaty was only ratified when the last country signed in 2014.

“Science has the answer, we have the answer to combat haze, but is there political will? The treaty failed to prevent the annual return of the haze between 2004 and 2010 and again in 2013, 2014 and 2015.” For Prof Zakri, it is this disconnect that is most disheartening and damaging. “It feels good talking in workshops, including this one today,” he reminded everyone, “BUT the stark reality remains.”

“In my area, in biodiversity, the facts on the ground is not encouraging...species are disappearing at up to 1000 times the natural rate of disappearance because of human activity and now climate change. In spite of all the talk... So, we have failed, ladies and gentlemen.”

“But all the same, INGSA is key. We need to carry on engaging our scientific colleagues but also engaging the business leaders and the politicians and finally I think, at least for me, we pin our hope on the youth.” “To a certain extent, my and Peter [Gluckman’s] generation, we have not achieved what we have set out to do. So, as the French lieutenant said in the movie Casablanca – Here’s looking at you, kid.”

In contrast, the next speaker was Mr Michael Halpern from the US Union of Concerned Scientists, promising to be the optimist on the panel, despite the current state of the US – “There’s still hope!”

Yet, US science is under sustained attack from the Trump administration, attempting to dismantle scientific capacity and even redefine what actually constitutes science and science advice. As an example, he points to a number of cases:

- The Environmental Protection Agency advancing a plan to restrict the types of science that can be used in making policy, by requiring researchers to make all raw data public before it can be considered. And the ridiculous situation whereby the EPA banned scientists that receive EPA grants from providing science advice to the agency.
- Agencies and departments putting political appointees in charge of reviewing grants.
- Cuts to the scientific workforce and either severing or greatly curtailing science policy fellowships that were the main pipeline for scientists to enter public service at a young age.

Breakdown in governance, corruption and division all help to create a disconnect between macro level intent, and micro level execution.

Yet despite the litany of challenges, Mr Halpern identified a number of lessons that have been learned.

“Knowledge enables power, but knowledge and information itself is not power,” he reminded the audience. “Effective science advice is about more than relationships and communication and infrastructure within government. Effective science advice also means building external power that makes this kind of activity and this kind of advice, actually politically palatable.”

One of his keenest warnings was that many of the entities that impede or contest the role of independent science advice, have nothing to do with government at all, yet they put forth lots of information and wield significant power.



“This is something that this community seems a bit reticent to address, or even acknowledge: that the forces that are taking action to undermine scientific advice exist, and they do so as they see it as a threat to their bottom line,” Mr Halpern challenged.

As an example, he noted the creation of the ‘Responsible Science Policy Coalition’ around the issue of PFAS contamination through substances such as fire-fighting foams.

“This new group is based out of a law firm in Washington DC that boasts that it helps clients ‘secure successful tolerance reassessments’,” Mr Halpern said.

“Now this organisation has been making the rounds in Congressional Office and state capitals to offer their services, and these are really tobacco industry tactics.”

In response to the government and private industry aggression towards science, scores of groups have sprung up all over the US in the past 2 years.

Knowledge and information itself is not power... Effective science advice also means building external power that makes this kind of activity and this kind of advice, actually politically palatable.

“The leaders of these new organisations...are all developing these muscles that allow them to organise their peers to provide science advice at all levels. This is really organising the infrastructure of the future.”

“[The response has been] to build connections and take advantage of that energy and put it into an ecosystem to both insulate us from the worst effects of the strongman rule, that were experiencing today, and that make us more resilient in the future so that when we do have a chance to rebuild institutions, we’re fully ready.”

For Mr Halpern, the decentralised nature of the organising is extremely important because the attacks on science are not just attacks on science, there are also attacks on the media, the judiciary, intelligence agencies, the military. And when everything is politicised, when everything is perceived as having an agenda, science-informed policymaking becomes more difficult.

“We want to bring all this work together in a coherent movement so that individual scientists working in partnership with scientific societies and civil society organisations can help make this long-term sustained vision more of a reality...Ultimately this also means getting involved in questions of democracy.”

Despite working in the UK, Europe and South Africa, Dr Carla-Leanne Washbourne, from the Department of Science, Technology, Engineering and Public Policy at University College London, also emphasised the value of bypassing government to provide science advice at different levels.

Her first example was in community-level science advice, and the UCL Engineering Exchange. It is a network of engineers, built environment specialists, various practitioners, and local communities working together to put UCL expertise into practice.

“Some of the products...have been things like the Green Infrastructure report for London. Which was a review of the evidence written in quite a non-technical way,” Dr Washbourne said. “It is currently being converted into fact sheets to be used as an evidence base for communities... giving them the skills to speak into that decision making language.”

There are, and should continue to be, healthy tensions between the communities involved... between scientists, between policymakers, and between politicians.

Dr Washbourne also spoke to her involvement with The Gauteng City Observatory Green Infrastructure CityLab project, a platform that was put together to facilitate co-production of a green infrastructure plan



for the Gauteng city region.

“The CityLab itself was a physical set of meetings which continued for a number of years and brought together people from all of these different communities. But it also produced various briefings as a result of those meetings, it created reports on the basis of the conversations that were had, the priorities that were highlighted by the various actors.”

The lessons she has drawn from her experience working at multiple levels of science advice has been that:

- A great deal is based on interpersonal relationships, the development of respect and understanding
- The visible and ongoing inclusion of people is important
- Information needs to be openly shared
- There needs to be some responsibility and ownership for the process, particularly the ownership of corresponding across these different levels, otherwise it is possible to create excellent things at all of these points that then fail to speak into one another.
- There are, and should continue to be, healthy tensions between the communities involved in all of these discussions between scientists, between policymakers, and between politicians.



PARALLEL SESSION 1.2

Technological Risk Management – Dealing With Uncertainties, Risks, Trade-Offs and Human Values

Technological change is inherently risky and inherently uncertain. Yet we rely on it to advance many societal goals and interests. More often than not, there are trade-offs associated with new technologies. Panellists from government, defence and academic sectors were asked to comment on what strategies there are to achieve the greatest benefit from promising technologies, while minimising the risks. Are there instances when decision-makers have been too cautious or not cautious enough and what are have been the implications?

Moderated by Dr Clarissa Rios Rojas, Founder and Director at Ekpa'palek and member of the GYA, the session demonstrated a wide range of perspectives on risk assessment according to context. The panel aptly contrasted how we think about different types of risk. From largescale risks, where the public has little choice in their exposure, to how to regulate new consumer technologies while leaving room for personal choice about exposure to their risks, to understanding the consequences of overprotectiveness in scientific research, the panel illustrated the diversity and complexity of attending to risk in a variety of contexts.



Starting with a military perspective on risk assessment, Ms Hema Sridhar, Science Advisor to the New Zealand Ministry of Defence revealed how the digital revolution has fundamentally changed how departments have to think about their military acquisitions, for instance.

Whereas, previously the success of buying military technology was judged by delivery on cost, scope, and schedule, “we realised over many years of doing this that it wasn't good enough,” Ms Sridhar said.

“Things like cyber and AI, things like ICT, previously, we would have said that’s a \$10 million project - it’s a real simple thing. Now we take a completely different look, we look at it from a scale and risk perspective...because every other major project we do is completely dependent and reliant on what this ICT project’s delivering, therefore, we resource it adequately. We set it up so that it succeeds .”

Part of this new consideration for the role of technology means also considering whether military technology advisers need to be a part of the broader government ecosystem. This culture change puts considerations of risk at the heart of the process.

“One of the things we also know is that we're not unique and we're not alone on that. Particularly for AI, blockchain, space, cyber we're not we're not going to be doing this by ourselves.”

“Being interoperable and being able to coordinate and share our information with other government agencies both locally and internationally are a really important part.” Working in a coordinated way with public policy and foreign policy makers is essential because the risks we are dealing with are systemic, which is new from a military perspective.

The need to consider risks in a more holistic and cross-sectoral way is a lesson that Japanese scholars and officials understand well, said Prof Atsushi Sunami, Vice-President of the National Graduate Institute for Policy Studies (GRIPS).

Referencing Ms Sridhar, Prof Sunami indicated that Japan had also changed its approach to technology acquisition with the creation of the Ministry of Defence’s Agency for Technology, Logistic, and Acquisition (ATLA) to bring together technology development and acquisition under one agency.

One key discussion that Japan is monitoring is the global debate over AI and LAWS – Lethal Autonomous Weapon Systems. Emergent issues such as this highlight the ethical challenges that global militaries face.

Technology is going very fast, and for the defence and military sector especially, this is a real challenge.

“Technology is going very fast, and for the defence and military sector especially, this is a real challenge. If there is some kind of rules and global understanding on this, this is something I think it's a very important to talk about.”

When you try to create control systems in a liberal, free society, you basically are limiting autonomy of people, and thereby limiting their freedom...creating a paradox

To illustrate the risk of insufficient foresight or planning around technology, Prof Sunami turned to the story of how he was in a nuclear technology symposium when the 2011 earthquake and tsunami hit. He was called in to the Cabinet Office from the symposium, to advise on the implications of the tsunami.

“We were getting new information minute by minute,” he recalls, “and we just didn't have any sort of institutionalised kind of mechanism for getting this new information and quickly making a decision on it and putting it out to the public.”

“One difficulty was that the minister or the government had to be in a press conference every hour to tell the story, but every time they appeared, the whole story evolved. The scientific and technological understanding of the situation was moving very quickly”

At the time of the incident at Fukushima, there was no Chief Science Advisor to the government, and thus no single voice able to assist in effectively conveying information to the public. Soon after, the movement to create a government science advisor began.

In any risk assessment, whether for the introduction of a new technology, or regarding a technology already in use, there is always the situation where the assessment might be too cautious or not cautious enough.

This key challenge was addressed by panellist Mr Pieter van Boheemen, Researcher at the Rathenau Institute, who turned the focus from centralised essential services, like TEPCO in Fukushima, to consumer technologies. Here, the role of the assessor organisation or individual is crucial to the outcome, yet this role is not well understood, Mr van Boheemen suggested.

The aim of risk assessors, and those who implement such recommendations, aim to minimise potential harm, while maximising benefit. But this balance creates a fundamental tension.

Mr Van Boheemen suggested that “when you try to create control systems in a liberal, free society, you basically are limiting autonomy of people, and thereby limiting their freedom. At the same time, we're trying to create a free society. By putting in place all these restrictions, you're also creating a paradox.”

At the Rathenau, when evaluating technology they try to take a holistic approach and judge against seven values: human dignity, justice, security/safety, privacy, autonomy, power, and control. He reminded the audience that just because a technology is ‘safe’ does not mean it meets the criteria for all these other factors.

To illustrate, he turned to the GMO debate, in which the EU previously only evaluated GMOs on their safety and security.

“All the activists were campaigning for the fact that GMOs are unsafe. Because the discussion prevented any other type of arguments, the whole thing went in the wrong direction. That's basically my point – try to make a risk assessment as broad as possible,” he said.

Associate Professor Vardit Ravitsky from the Bioethics Program within the School of Public Health at the University of Montreal also addressed the challenges of ensuring that risk assessment are appropriately pitched, to reflect agreed societal norms, without restricting important innovation. By way of illustration, Dr Ravitsky suggested that one of the most pressing issues facing scientists and legislators looking at reproductive technologies is the potential of CRISPR and human gene editing.

“When it comes to the germline, embryos, and gametes, there's quite a sense of panic that we're about to cross a barrier that we have never crossed before, and therefore a call for caution.”

Human dignity, justice, security/safety, privacy, autonomy, power, and control...Just because a technology is ‘safe’ does not mean it meets the criteria for all these other factors.

On one hand, the technology is optimistically presented as being able to eradicate all disease; yet on the other, the risks are presented as equally enormous – from eugenics to irreversible ‘off-target’ genetic changes for which the consequences are unknown. Issues of social equity and justice also must be considered.

Naturally, the risk response of governments have varied on how to regulate such techniques. But Dr Ravitsky points out that there is a distinction between regulating downstream applications and regulating the fundamental research in the first instance. In Canada, the law governing experimentation on embryos is opaque and the government has refused to change or clarify the law, raising the potential of jail for scientists undertaking legitimate research.

“We end up having governance that is unclear, or too restrictive, and did not appropriately foresee ensuing challenges, and now is ill-equipped to deal with a new reality,” said Dr Ravitsky.

“Yet, we do have the governance mechanisms and research ethics to cope with this,” she said, indicating the strong influence of public perceptions. An inclusive conversation on these issues is imperative to understand the risks and responsibilities of science so that research potential stays within socially acceptable bounds but can – in a measured way – help to expand our perceptions of the possible.

The issue of inclusivity was then picked up on by Dr. Yasunori Kimura, Principal Fellow at JST and a Fellow, of Fujitsu Laboratories Ltd. For Dr Kimura, as technology becomes increasingly entwined with human existence, then it is responsible that citizens have a greater understanding of the technology.

"AI and the Internet are starting to enter deep into your mind, as well as our society, so I believe cooperation with humanity and social scientist is essential...We don't know much about the human side of knowledge as engineers. Yet when we build upon our social system with technology, we should know - in the human context - what the limit of the system are, what the system can do, what it cannot do."

"Technology should be democratised...it is not only for researchers or engineers, it is for all citizens. Engineers, including me, are sometimes very arrogant. We should not take a technology-first policy," he said.

Using AI as an example, Dr Kimura highlighted that AI will be able to assist humans in smarter judgements. Yet as machine learning begins to depend more on deep neural networks and self-learning, scientists and ethicists are encountering the 'black box problem' where outputs do not necessarily reflect the inputs. This could be because the inputs are flawed or because the AI is making connections beyond the understanding of its creators.

He highlighted the examples of algorithm bias, and that currently the only way to have a perfectly balanced outcome is to have perfect input data for the context, which is a problem. Yet some of these risks can be mitigated by being as transparent about the development and implementation as possible, which enables feedback, consultation and social licence debates.

"The system itself, any results, and the social implementation of the system should be publicised to everyone even if the result is an unfavorable one."

Taken together, the panellists addressed a variety of uncertain situations where assessing the risks was a crucial step to response. The urgency of honest, science-informed and inclusive societal discussions about risk and uncertainties was highlighted - whether at individual or population scales, or as a consequence of deliberate or inevitable exposure.

The risk response of governments have varied on how to regulate such techniques. But... there is a distinction between regulating downstream applications and regulating the fundamental research

PARALLEL SESSION 2.2

Mapping Critical Policy Nodes – Identifying the Articulation Points Between Interacting SDGs and Domestic Policy Priorities

With 17 Goals and more than 169 targets, how can policymakers begin to address the SDGs as an interdependent and integrated set of outcomes, with full awareness of the tensions and opportunities between them?

What's more, taking positive action on one goal could have a detrimental impact on another, but indirectly help progress yet a different goal. As was mentioned across many of the INGSA2018 sessions, the complexity of these interactions are a possible complication for policy makers, but it can also result in options to accelerate progress.

INGSA and the International Council for Science (ISC) are embarking on a project that will not only map the key critical interactions, but also support countries to prioritise them in accordance with national contexts and domestic policy goals. Moderated by Ms Anne-Sophie Stevance, Science Officer at the ISC, this session interrogated what is meant by 'interactions' and emphasised that the SDGs will interact in different ways at different levels and in different contexts. It is also critical to appreciate the different granularity of interactions, and that broad high-level interactions can have self-reinforcing effects on the fine-grain policy details.

INGSA and the ISC are embarking on a project that will not only map the key critical interactions, but also support countries to prioritise them in accordance with national contexts and domestic policy goals

After three years of discussion about the SDGs, it is optimistic to see a number of countries actively trying to integrating their responsibilities at a governmental level, whether it is through institutional mechanisms, mapping and reviewing activities, or by bringing the SDGs into the budgetary process, Ms Stevance said.

Yet challenges persist around the practicalities of integration and implementation, as well as honouring the spirit of the goals while meeting national priorities. This lead directly into the presentation from INGSA Chair, Sir Peter Gluckman.

"Are the SDGs really just an aspirational set of goals or can they actually be a toolkit for driving progress?" Sir Peter mused. If the former, then countries will just rebadge their current work under the SDGs; if the latter, then there has to be a framework for operationalising these in a way that can influence the policy process and amplify the benefits of activities. It is this framework that the SDGs are currently missing.

The jump from aspirational to real world is the next big step for the SDGs. "Nation states have other frameworks to consider...Equally at the political level, governments want to be seen to respond to their citizens rather than a UN directive."

"Thus to have any kind of policy impact the SDGs need to be linked between these realities," Sir Peter said.

A project is underway, lead by INGSA and ISC, to map the SDGs interactions and to create an interface that allows stakeholders to visualise these interactions within their own specific policy context. "These interactions matter because it's where much policymaking habit happens. It's where policy risk and reward can be better understood. They illustrate the tradeoffs and spillover effects which effectively underpin every political decision in public policy."

"Interaction nodes may, in the first instance, be different between scientists and policymakers. That is the whole point of the exercise, to actually start a reconciliation, an iterative process to create an opportunity for the knowledge community and the policy community to work together to understand what those differences are and why they exist, and see whether they can be reconciled."

A number of countries have already put up their hands to pilot the process, and a number of treasuries are interested in what benefits this might have for modelling when money is introduced. One of the obvious first ways to start deploying this interactions mapping is to overlay it on the work countries have already done to plot their priorities, such as with national roadmaps.

Japan has a highly developed system of roadmaps across different level of governments but, as indicated by the next speaker, Mr Satoru Ohtake, Principal Fellow at Japan Science and Technology Agency, action

Governments want to be seen to respond to their citizens rather than a UN directive...to have any kind of policy impact the SDGs need to be linked between these realities

mapping is also critical to understanding the situation on the ground that will affect SDG outcomes.

He exemplified the work of the University of Tokyo and Okayama University, which have undertaken the task of mapping hundreds of projects across their universities against the Goals. This enables the university (and government agencies) to see where the momentum already exists and influence their planning for maximum effect.

In Japan, the IGES-SDG program has already undertaken a similar effort to map the SDG interlinkages and have similarly chosen nine countries around Asia to evaluate synergies and tradeoffs and identify those critical nodes.



“Road mapping, mapping current activities, identifying node with synergies, and scoping to make complex node become simpler, are all critical to success,” Mr Ohtake concluded.

The next to take the floor was Dr. Ernesto Fernández Polcuch, Chief of Section for Science, Policy and Partnerships in UNESCO. He advanced the opinion that, while roadmapping and interactions are the fine grain detail that will be required to achieve the SDGs, there are also higher order synergies that can make some impact on the complexities presented.

“When we look at how UNESCO looks at the integration and the interconnection of the goals, we ourselves are involved in 12 goals out of 17,” Dr Polcuch emphasises. This is because science itself is so fundamental to how the SDGs have been formulated.

By advancing SDG 4 [equitable education] not only does it feed the scientific capacities of the population, it also feeds a scientific culture into policy-making that can become self-reinforcing

“Suddenly, the global agenda is a tool to promote the importance of science, which was not so clear with the Millennium Development Goals.”

This means that in countries or organisations or regions where there is not a strong science system the possibility of achieving effective action on the SDGs is severely weakened.

“If we don't have science, we don't have science advice, we don't have interface, we don't have anything...this whole model starts to leak.” Therefore, the value of a culture of science cannot be overstated and in fact offers compounding effects to a country's efforts.

He offers the example of SDG 4 - equitable quality education and lifelong learning opportunities for all. By advancing SDG 4 not only does it feed the scientific capacities of the population, it also feeds a scientific culture into policy-making that can become self-reinforcing, assisting the other SDGs indirectly.

“If we don't have a scientific culture, if the scientific culture is not sufficiently developed, why would the policymakers ask scientifically relevant questions?” Dr Polcuch asserts.

“The quality of education in terms of STEM education, of scientific literacy, of informal education, of the science museums, of the science journal, everything that is around science communication is very, very important in this framework.”

While it is key to understand the high-level interactions and potential of the SDGs, it is also critical to think about the most effective ways to facilitate acting upon them once they are identified – ie. what foundational measures need to be put in place that can help provide fertile ground for long-term change.

In discussing this interplay between broad-scope vision and fine grain mapping, Dr Apollonia Miola from the European Commission's Joint Research Center was on hand to provide an illustrative example of how this is understood and practically actioned in the European Commission.

“I'm leading a research project which is building a knowledge base for SDGs' implementation for mainstreaming SDGs into European Union policies, identification of interlinkages and building a European Commission community of practice on SDGs,” Dr Miola outlined.

“We analysed the entire legislative body of the European Union, classifying all these policy actions alongside the 17 goals... The magnitude of the exercise was enormous, so we involved 28 European Commission directories, 200 policy experts plus scientists, our colleagues, and we analyzed 1789 policy actions.”

The results were published a year ago and provided a platform that enables anyone to select a Goal and to see the EC policies relevant for that outcome. They have since created a matrix that enables policymakers to see the key policy nodes, empowering a systematic approach to policymaking's effects on SDGs.

"If you want to transform the policy context, if you want to achieve the policy coherence for the SDGs, you have to act simultaneously. You have to coordinate action across policy domains. You have to consider any new policy domains," she said.



In addition, the EC are undertaking meta-analysis of the peer and grey literature on interlinkages as well, to try to understand whether there is agreement, and how these change across contexts.

The next step will be to analyse the impact assessment for every single policy to understand the whole system impact on the SDGs – working towards greater policy coherence and to guide budgetary decisions. This illustrates that it is possible to take an evidence-based approach to integrating the SDGs and consideration of their interactions into a whole system approach that integrates into all policy decisions.

Yet for Québec Chief Scientist, Prof Rémi Quirion, even if you have a coherent policy system, with clear outcomes for the SDGs, it does not necessarily guarantee effective implementation on the ground. There are a number of key considerations that need to be instituted now in order to enable the appetite and the skills required for long-term change.

"Act Local, Think Global," Prof Quirion quoted. "Success depends on not leaving all the activity to international organisations or even to national elected officials. It needs to move down to the ground, to civil society, to the community, to the city."

Capacity and integrated thinking needs to be fostered at this grassroots level, he believes, and there are a few key ways of laying this groundwork now.

1. A greater effort to engage social scientists, artists, ethicists, rather than relying on natural and physical scientists to provide evidence. Social scientists help strengthen the bridge to the community and can empower action at this local level
2. Gender diversity – "Success depends very much not leaving 50% of our society behind, or not involving them. Gender equality is key to address poverty, hunger, education disparity, etc."
3. Understand the fundamental role of cities and develop capacity for action at a municipal level – "Wealth is often concentrated in large cities, and poverty as well. Natural disasters often have much larger impact in cities. Cities are responsible for about 70% of the greenhouse gases. Health and nutrition, food, and security-related issues are often much more present in cities. It's clear that SDG 11, Sustainable Cities, is at the nexus of many of the SDGs."
4. Embed climate change as fundamental to most, if not all, decisions both locally and abroad. Climate change will impact upon whatever action is taken on the SDGs, and this integrated consideration of climate must be institutionalised at local levels, through to international actions.

It is all well and good to have an understanding of the interactions of the SDGs but if these local elements are not in place, then change will be hard to enact and will face greater resistance, when time is of the essence.

Following this, questions from the floor sparked a lively debate including the tension over the need to simply the SDG targets and indicators, versus the risk of oversimplification. Regarding the SDG indicators it was also asked whether they were attractive to countries and whether they were in fact the right indicators? The European Commission, for example, uses a different set of indicators to monitor progress on the SDGs, while UNESCO and INGSA are seeking to augment them with additional indicators.

It was also asked how does individual leadership differs from political leadership on the issue of the SDGs, for examples within the EC? And how to protect structures against the changes of political cycles – does legislation play a more important role in providing continuity?

If you want to achieve the policy coherence for the SDGs, you have to act simultaneously. You have to coordinate action across policy domains.

PARALLEL SESSION 3.2

Skills Development for Evidence Brokerage

Those engaged in science advising are more than communicators in the traditional sense, they are evidence brokers. This role encompasses a skillset that straddles multiple domains of expertise. What characterises evidence brokers in both the innate and learned components? Session chair, Mr David Mair was recently involved in the European Commission's Joint Research Centre (JRC) efforts to map the essential skills, with a view to building capacities of brokers at the interface of evidence and public policy.

He kicked off the session in an unorthodox manner by asking the audience for their questions first, so that panellists can consider them in their interventions.

This garnered questions relating to:

- Tips for perseverance when providing advice to people who might not be keen on listening.
- What kind of incentives or incentive structures can be provided to researchers to get them more involved in evidence brokerage?
- What skills are needed to translate between two types of the same language, e.g. Researcher language vs policy-maker language?
- Where can young scientists get these skills, is there formalised assistance in place?
- Do the international differences between countries and their advisory processes matter, or are skills generally universal?
- How to scale up personal connections with policymakers to create an impact by which the conversations will continue even if you're not involved?
- Is it fair to ask scientists to learn these skills or should there be paid intermediaries so that scientists don't feel like they have 2 jobs?
- Do we have, or do we need, a taxonomy of policy advice types?
- How do you broker evidence when there are two divergent scientific views from scientists at the same policymaking table?



Faced with this formidable set of questions, and a highly-engaged audience, Ms Emily Hayter, Senior Programme Specialist at INASP was the first to take the stage. INASP is an international development NGO with a mission of strengthening research systems to inform national development. Their evidence-informed policy work focuses primarily on the demand side.

You can have excellent systems and processes within an agency, but if you don't have individuals that are aware of how to use evidence...then the processes don't have meaning without the individual

"Impact in this space is about understanding all of the layers of capacity within an agency," Ms Hayter began. "You could have great connections between supply and demand, but even if you are supplying excellent evidence, if you don't have strong processes to assess that evidence and provide it to the right decision-making point at the right time, then you are not going to have good evidence-informed policymaking."

"Likewise, you can have excellent systems and processes within an agency, but if you don't have individuals that are aware of how to use evidence and how to appraise evidence, then the processes don't have meaning without the individual."

Individual skills can be broken down into:

- Engaging: The ability to make a case for an issue and to spark interest
- Foundation building: The basic building blocks, starter knowledge
- Skill strengthening: Developing hard skills such as writing policy briefs
- Competency building: The capacity to deploy these skills effectively in the workplace.

Along these lines INASP developed their Evidence In Policy Making (EIPM) toolkit for mid-level civil servants in low and middle income countries and was used in such countries as Ghana, Zimbabwe and Sudan.

A number of key lessons were learned during the development and deployment of the toolkit:

- Soft skills are really important – such as empathy and communication skills
- Adult learning principles really matter, such as being able to direct their own learning, and content has to be directly applicable to their workplace
- It is important to learn about learning: be open to feedback and co-design where possible
- Training is not the only way to develop skills: There are many other capacity development interventions so don't always default to assuming that training is best

In addition to the skills of individuals, it is also critical for evidence brokers to be aware of how messy and complicated policy development can be, as sometimes the best of processes and evidence will still not result in the policy outcome that might be expected, particularly in contested situations.

Training is not the only way to develop skills: There are many other capacity development interventions so don't always default to assuming that training is best

Prof Carlos Abeledo is a professor at the University of Buenos Aires and the Chair of INASA-Latin America and he underscored the need for policymakers to be resilient in the face of potentially disappointing outcomes from hard policy questions.

As an example, Prof Abeledo mentioned the issue of fracking in Argentina. "The petroleum industry is very much high on this," he said. "The government is also enthusiastic, because it is going to solve Argentina's energy problem, but this is an area where we have native communities, and there is currently no specific legislation for fracking."

Not only do you have several SDGs competing in this situation – energy security, the environment, the rights to self-determination – you have a range of powerful stakeholders, a government with a vested interest, and environmental protestors.

He poses the situation whereby the geologists all agree that it is safe to frack in the region, yet it is highly likely that the environmental agents would still escalate their protest to the courts or even the UN. Compounded by negative public perception, this creates an even more complicated situation for a government to navigate.

"In a situation as complex as this, society will have doubts...there will be lobbying in society, you will have industries that will be doing lobbying," Prof Abeledo said.

In situations such as this, honest brokers still have to "try to deliver information that is dispassionate, truthful, and that filters out fake news and post-truth." And they need to be able to still have faith in the process even if the ultimate policy choices do not necessarily match with the advice given.

Indicating what skills science advisors require is critical; but equally so is the discussion around how people working at the interface can effectively learn these skills.

When the scientists are embedded in this program, they are operating - and they are being trained to operate - at all levels.



Dr Marga Gual Soler was Senior Researcher at the Center for Science Diplomacy at the AAAS, and she provided an inspiring and concrete example of how skills can be taught by embedding people right at the coalface.

For 45 years, the AAAS has been undertaking a Science and Technology Policy Fellowship Program, which embeds scientists for one or two years within a government agency, congress or the judiciary. As well as providing structured opportunities for training and capacity building, the strength of the program is in the day-to-day experience of working in the role.

Science is able to provide a frame and to assist with not only the answering, but also the asking of questions. And in order to ask the right questions, interdisciplinarity is key

“The model is about immersion,” Dr Gual Soler emphasised. “With one program, you kill two birds with one stone.”

“First, for the scientists, to develop the skills and the capacities to be able to understand and provide their scientific skills and evidence into the policy process. Secondly, and at the same time, to change the culture of government to be better able to absorb science knowledge.”

“When the scientists are embedded in this program, they are operating - and they are being trained to operate - at all levels.”

The program initially started with seven placements and are now managing 250 fellowships, and more and more government offices are requesting fellows to be embedded with them. Over 3000 people have been through the program since its inception.

This success has attracted the interest of other countries keen to institute immersive mechanisms of embedding scientists in government. This prompted AAAS to map similar projects around the world, the result of which was the 2017 Connecting Scientists to Policy Around the World report.

Next to speak was Prof Mitsunobu Kano, Vice Executive Director and Chair of the SDGs Initiative Planning Committee with an important point about the need to consider cultural and language context when providing science advice.

He posits the example of the word ‘broker’ – in Japanese the word does not have the dispassionate connotations of a middle-man. Rather it invokes the image of someone who aims to maximise their profits in a transaction.

Cultural differences extend far beyond subtleties of translation. Western societies value diversity, difference and individualisation, which promotes an understanding that arguments and positions need to be argued and proved.

In contrast, Asian norms see value in similarity, consensus and unity. It does not promote a culture of debate and the provision of evidence, but adherence to authority.

“I find that it’s similar in Africa and also in Mexico too, and therefore, the Western view may not have prevailed in the world yet,” Prof Kano said.

“I wish to emphasise the importance of cherishing your question. This is not happening in Asian countries – the Asian way is to suppress questions.”

Science is able to provide a frame and to assist with not only the answering, but also the asking of questions. And in order to ask the right questions, interdisciplinarity is key. Evidence can come from many different angles and can even seem contradictory.

“[On any issue] some proofs might come from natural sciences, but some proofs may come from humanities. Why are they so different now?”

“If you come to a question which needs proofs from both sides, you may be able to connect both sides of people.”

Particularly in tackling the SDGs, which cut across national, cultural and language divides, context is critical in bridging understanding, enabling effective action, and connecting people, Prof Kano concluded.

When talking about the skills required for effective evidence-to-policy translation, not only is it important to know WHO you are dealing with, as recommended by Prof Kano, it is important to know WHAT you are trying to change.

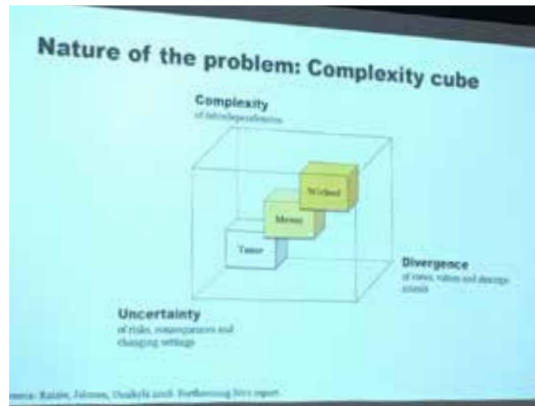
Complex problems: the phenomenon is usually emergent, which means that any action that we take can actually change the relations between the factors involved

Ms Eeva Hellström is Senior Lead at Sitra, The Finnish Innovation Fund, and she impressed upon the audience the importance of understanding the problem before trying to provide advice.

“The fact is that tame, messy, and wicked problems all benefit from difference kinds of approaches to knowledge brokerage,” Ms Hellström said.

Tame problems usually exist in stable conditions where causal relations are rather clear – for knowledge brokers the key skills are to identify, categorise, find or solve, by commissioning or collating the best evidence.

Messy problems are often characterised by an abundance of evidence, which makes it challenging to identify all relationships between the factors involved. There is usually a wide range of good solutions, which means that the keys skills for an advisor would be system analysis, and the ability to clarify, judge, and analyse.



“But when dealing with wicked or complex problems, the phenomenon is usually emergent, which means that any action that we take can actually change the relations between the factors involved.”

“Even the best evidence may be ambiguous and divergent views will exist; there may be no logically deductible solution to the problem. The keywords in knowledge brokerage are really about sense making and interpretation.”

“Many of our approaches to knowledge brokering have been developed for dealing with either tame or messy problems, and they are not necessarily capable of addressing the type of really wicked or complex problems or societal challenges that we have in today’s rapidly changing and volatile world,” she warned.

Not only are policy problems more complex these days but so too is the information environment. Hierarchies of evidence work quite poorly in a world where complexity rules, where information flows freely, and where the authority of gatekeepers of knowledge is weakened.

Hierarchies of evidence work quite poorly in a world where complexity rules, where information flows freely, and where the authority of gatekeepers of knowledge is weakened.

“The first skill is understanding the true nature of complexity and how complexity really differs from what we are used to calling ‘complicated’, and secondly, skills are needed for managing and respecting diversity of knowledge and expertise and not just evaluating the quality of different forms of information.”

“We also need skills for facing and dealing with true uncertainty that doesn’t arise from the lack of evidence, but from the emergent nature of the phenomenon itself. Thirdly, we need skills that enable us not only to communicate evidence effectively, but to have an impact on the deeper unconscious mental frames that guide decision-making,” Ms Hellström concluded.

In all of these presentations, the issue of complexity was raised. This underpinned one of the key points made by Vladimír Šucha’s keynote earlier in the day – that science advice is no longer about building bridges between groups, it is about holistic interactions required to produce holistic options/solutions for non-binary problems.

As problems become more complex, the necessary mechanisms to deal with them have to reflect this complexity; so too does the need for advanced skill development that can appreciate and work across – and between – levels of complexity.

PARALLEL SESSION 4.2

Smart Cities – Science Advice for Urban and Urbanising Contexts

Increasing urbanisation means that the world's cities are positioned at the heart of the SDGs. The metropolitan/municipal level of government is the closest to the site of action on sustainability and social innovation and it is the prime testbed for new sustainable technologies and for exploring social acceptance of these.

As was demonstrated throughout this session, cities are a key societal nexus in which evidence and policy directly affect the lives of citizens, as well as the critical meeting point of private industry, public opinion, technology, finance and politics.

As well as these drivers, large cities are especially diverse and socially fragmented, sometimes to a greater extent, than at macro scales. In addition, they may not have access to the level and quality of advice as higher-level jurisdictions, which can create tensions. Yet, as was noted several times in the presentations, we are now seeing collaborations, networks, and increased information sharing, offering cities a greater level of agency in effecting change at the municipal level, as well as influencing policy at higher levels.

The session was chaired by Dr Rob Moore who, as Executive Director of the Gauteng City-Region Observatory, is well situated to discuss the urban/science nexus. The Gauteng province of South Africa makes up only 2% of the geographic area of the country, yet it houses 25% of the population, produces 1/3 of the country's GDP, which accounts for 10% of Africa's entire GDP.

Alongside the standard issues facing urban and urbanising regions, the legacy of apartheid in South Africa has meant that much inequality and racial differences are defined in spatial relationships. The Observatory works to raise the understanding of these inter-relationships and how they interact across administrative levels, to help the region make informed policy choices for the future.

The Gauteng example encapsulated a lot of the issues facing regional and sub-national urban centres, including the technological, social and economic challenges that would be touched upon by the rest of the panel.

First to make his intervention was Dr Wee Kean Fong, Global Lead for Subnational Climate Strategy at the World Resources Institute (WRI), a research-based NGO that works on six global challenges: climate change, energy, cities, water, food, and forests. For Dr Wee Kean, the role of cities in subnational climate change policy is critical.

"From the consumption perspective it's about two-thirds to three-quarters of global emissions are due to cities. If we look at the global population, more than half of the global population is in the cities."

Two-thirds to three-quarters of global emissions are due to cities...more than half of the global population is in the cities



Yet what appears to be happening at the level of cities is that many of them claim to lack capacity for meaningful climate change action, that they don't have the resources or the tools. "I think a lot of that is because of the lack of science advice at the local level," he suggested. "It's not like at the national level where you really have a lot of resources."

"The methodology, the tools, the training they need, the research they need and someone to help them to consider all this from a science perspective and help prioritise action – it is really lacking at the city level."

What the WRI has been doing over the last decade is to engage in 'evidence-based climate action planning'. They work with cities to identify the relevant data, develop ideas for action, create a plan for the city to implement and then track the performance of each action. He used the City of New York as an example that used their process to set a 2030 goal of 30% reduction of emissions, which has led them to set viable subsequent targets for 2050 of 80% reduction.

And the lessons? That with time and patience, and being able to offer municipal governments expertise and advice they might lack, it is possible to have really enthusiastic uptake of evidence into actionable policy.

One other key element to maximising the utility of cities, while minimising their environmental impact, is the push towards 'Smart Cities' where technology and data are integrated into complex systems to enhance the lives of citizens. Autonomous vehicles are envisioned to be a large part of this evolution of

the urban, and encapsulate many of the issues around social licence, regulation, and implementation that affect technological adoption.

Prof Takashi Oguchi from the Institute of Industrial Science at the University of Tokyo has been heavily involved in the Japanese government's efforts to develop, promote and introduce automated vehicles to the country. The key policy driver for this has been through the Cross Ministerial Strategic Innovation Promotion Program, known as the SIP. As well as appreciating the need for multiple ministers to be engaged across innovation sectors, the SIP receives direct oversight by the Prime Minister.

To form an ecosystem, it is not just the vehicle itself but also the social support and laws and also the service schemes in place for users

The SIP is made up of ten different sectors, one of which is autonomous driving, known as SIP-adus (Automated Driving for Universal Services).

One area in which Japan excels is in engaging its vast and highly-resourced private industry. SIP-adus is an excellent example of not only industry-government-academia partnerships, but of the necessity of incorporating international perspectives in developing technologies that will need to be transnational.

"The leader of [SIP-adus] is from Toyota," Prof Oguchi said. "Some others are from academia and the program consists of three different working groups." One working group is focused on the technical issues, the second on international cooperation. "Automated driving promotion should be much more international harmonised," he suggests. "Great benefit will come from human-machine interface systems being standardised."

The third working group has been set up to work on issues of social licence. Yet this was not an initial element of the project and Japan has had to evolve their picture of what the key factors are in successful technological uptake, Prof Oguchi said.

"Initially the project was highly technical but only in the last 2-3 years have they gradually become aware that automated driving is not just about the technological side, but rather more about the human being, the social science, laws and some economical issues."

"To form an ecosystem, it is not just the vehicle itself but also the social support and laws and also the service schemes in place for users."

How we can measure the performance of cities, how we can compare cities, but primarily, how we can anticipate the future issues that governments at every level will face?

Just as Japan has had to adapt their development model to predict what the future social issues will be, the European Commission also understands that the predominance of issues that will arise at a national level will originate in the population centres. A lot of the work to provide insight and horizon scanning for the EC, falls to their Joint Research Centre unit, at which Dr Alice Siragusa is a researcher.

"Sustainability has to be dealt with at city level, because it's in cities that most of the population is living now and will live in the future, and the trend towards a very high urbanisation rate," Dr Siragusa stated. "So how we can measure the performance of cities, how we can compare cities, but primarily, how we can anticipate the future issues that governments at every level will face?"

To develop and manage the knowledge base across different units and priorities, the JRC developed a number of Knowledge Centres, one of which relates to Territorial Policies. This aims to collate and make accessible all the information policy makers might need to inform urban policy choices. As well as providing analytical tools, it enables modelling to understand how elements such as urbanisation, population, or CO2 emissions have changed over time or are predicted to change in the future.

"We have tried to create an arena in which we can talk about what are the evidentiary needs at different levels of governance," she said. "We have also built direct collaboration with cities (City-Labs), to have pilot cases to really understand if our research activities are used and how they can be useful at different levels of government."

For example, they provide urban profiles that provide information on 70 indicators and that can be compared across 700 European Cities. This data aggregates official data sources such as social infrastructure, transportation and satellite data alongside web data such as online booking statistics and real-estate data, as well as citizen data such as from personal weather stations.

"Usually population information comes from the census...but these are the people who live and use that area at night. So what happens during the day?...For example, by using online booking service data we built a database in which we know how many tourists there are in the city during the day. We can produce a map that is seasonal, as well as for day and night."

The JRC are now expanding their work beyond Europe and adapting their models to work in African cities as well.

“Lastly, we are working towards expanding this network of City-Labs, to continue testing our information, especially linked to the SDGs because we think that is a good framework for a city to understand, and to focus on, specific priorities.” For the JRC it is critical to understand the interconnectedness of different types of data across the urban landscape to provide a bird’s eye view of urban centres and how they are changing.

For Dr Carla Washbourne from University College London, it is critical to remember that, just as every person in a city is interconnected, there are valuable interconnections between cities. The networks that can form between cities or regions can enable the learning of collective lessons.

As an example of these networks, Dr Washbourne listed the C40, ICLEI, Metropolis, 100 Resilient Cities, and the work of the Rockefeller Foundation. For her talk she focused on the Urban Observatories project, such as the Gauteng City-Region Observatory (GCRO) introduced by Dr Rob Moore at the start of the session.

“One of the really interesting things...is that there is quite a diversity of ways in which these observatories are formed and that they are effective in different ways,” she related.

“They can take the form of city-university partners such as the GCRO...sometimes they can be from somewhere in the public sector. They can be globally influenced or instigated, or they can be driven by local authorities, they can be bottom-up initiatives.”

“They all ultimately come to act within the space of data production, knowledge generation, and communication into decision making, but they come from quite different places.”

Dr Washbourne offered the Al-Madina Local Observatory in Saudi Arabia as an example. It was established in 2004 following the conversations by UN-Habitat around urban observatories. It now forms part of an active and growing set of observatories in the region and actually sits within a policy department.

“It has an interesting remit. The impact of this particular observatory is to report to the indicators produced or needed by UN-Habitat – key indicators that feed into things like the City Prosperity Initiative and their reportage on SDG-11.”

The value of urban observatories is, obviously, to address local challenges using very specific local knowledge. Yet they are also in a position to augment this ability by interacting with other cities in the region to feed into national policy priorities and reporting. This influence then extends upwards to global reporting and cross-border interactions through the international networks previously mentioned.

And beyond simple data or infrastructure sharing, these international networks facilitate inspiration and creativity, which should not be underestimated. “We can now know things about these urban spaces that we didn’t know before, we can put them together in interesting ways to give insights we actually wouldn’t have had.”

“So, yes, there is that very technical element, the very practical element feeding into decision making, but actually to be able to highlight really new interesting, engaging, and creative things about the urban spaces is exciting.”

The discussion section of the session raised a number of questions including how China might use the huge amounts of data collected from citizens to facilitate Smart Cities, given the particular political system doesn’t necessarily incorporate citizen involvement in the same way that western countries do.

Dr Wee Kean Fong touched on the question of privacy and the use of data, particularly in Europe in the wake of the EU Privacy laws. Dr Alice Siragusa picked up the discussion, saying that not only is data privacy an issue, but also the sustainability of integrating public and private information into an official knowledge system.

Private companies control the information they release, meaning that results might be incomplete or withhold critical information to stop replication. Can an integrated knowledge system be relied up on when some of the datasets might be incomplete or unable to be validated? And what if the corporations don’t exist in 5 years? It necessitates methods for using that data to minimise risks.

There was also a question regarding climate change and the panel’s opinion on whether a city’s reaction to climate change is related to the direct risk a city faces from, for example, rising sea levels? The questioner suggested that there might be a disconnect between local and national priorities, given the prevalence of lobbyists and fossil fuel interests targeting national politics.

Just as every person in a city is interconnected, there are valuable interconnections between cities... [enabling] the learning of collective lessons.

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PARALLEL SESSION 1.3

Big Data Transforming Policy-Making – What Are The Opportunities And Challenges?

Big data has been described as a new gold rush. Mining databases with new questions, linking and combining them in novel ways is able to reveal new insights and patterns about the behaviours, health, mobility, and other trends about people and things. How has the introduction of big data capabilities transformed the public service?

Dr Anders Karlsson, Vice President of Global Strategic Networks at Elsevier, moderated the session and he began by placing the question of Big Data against one of the themes of the conference – the SDGs. Even the UN has an agency – Global Pulse – dedicated to using Big Data for sustainable development.



Dr Karlsson also wasted no time in drawing out some of the key issues around Big Data – trust, governance, the possibility of bridging the North-South divide, the role of AI, and the effect of all of these on policy making.

Humans have always collected and analysed data; it's what our brains are for. The ability to collate and act on diverse information has been the key to the success of our species. Yet all of a sudden we now have 'Big Data' – more data than we could ever collectively use. Professor André Carlos Ponce de Leon Ferreira de Carvalho, is from the Institute of Mathematical and Computer Science at the University of São Paulo, and he laid out some of the issues arising from the rapid uptake of Big Data.

“Until recently, when you were using data you could assume that the data warehouse was static. Now data is produced in a continuous stream by [the Internet of Things (IoT)], our smart watches, everything. The model you are trying to work can now be outdated in a few seconds...so you have to be able to autonomously update your model as new data arrives.”

“One of the most popular techniques for analysing Big Data streams is through Machine Learning. But the rapid need for expertise means that there's a shortage of experts...there are many people working in the area but not the expertise.”

This has led to a movement to try to automate machine learning – essentially the machine learning of machine learning. The aim is to create a system into which you put a problem and you receive a solution at the other end – rather than needing human intervention, the system is able to determine the optimal method for solving the problem, essentially coding itself and able to adjust the underlying algorithm under changing conditions.

Machines building machines runs into a suite of issues usually associated with AI, including the ethics of creating something beyond human ability to understand and provide oversight on. It is not so wild a thought, Prof Carvalho said, to use Big Data technologies to create policy based on evidence. If machines were better at this, then would it be a bad thing? Is it unethical to hand over your democratic duty to a computer? Or is it unethical to not hand over that responsibility if the computer provides better outcomes for your citizens?

Despite being a highly technical field, the issue of data and how that data is used, possesses a highly social facet. These days everything we do creates data and therefore processes that collect, aggregate, filter, utilise, and make decisions based upon that data, are deeply connected to the social lives we live.

Two of the panellists had strong connections to New Zealand and were keen to use the country's Big Data initiatives as an example, offering complementary presentations.

The first was Ms Kristiann Allen, the Secretary of INSGA currently seconded to the Office of the Canadian

The system is able to determine the optimal method for solving the problem, essentially coding itself and able to adjust the underlying algorithm under changing conditions.



Chief Scientist, who provided a warning against the impulse to outsource responsibility to the data, and the importance of keeping the human in the system.

The second was Prof Jennifer Prof Curtin from the Public Policy Institute at the University of Auckland, who offered greater detail on the history and utility of NZ's flagship data platform.

New Zealand is a small country and a member of The Digital 9 (D9) - a network of the world's most advanced digital nations. One of New Zealand's initiatives had been to create the Integrated Data Infrastructure (IDI) – a platform that brings together diverse data sources to enable academics and policymakers in their work. It provides granular information about populations and trends across numerous domains.

“The benefit of having connected government datasets, is in overcoming traditional silos, and you're able to ask questions differently by linking up different types of data,” Ms Allen said.

“It can support a shift in the type of policy narratives that then underpin policy solutions...it also supports a shift in focus from looking strictly at the outputs to also looking at the causation.”



Yet, she reminds everyone, it is never as simple as getting the right data to the right person at the right time; evidence or data do not make policy, they can only inform it. It also should only be utilised with the tacit approval of the people.

“NZ has also tried to have a national conversation about who owns the data, how it is used, and what are the types of social licencing considerations. Getting social licence to use these kinds of data really means having very robust governance and data stewardship in place that are inclusive.”

It is important to also manage expectations for what the data can provide. Historical data can provide predictions but it cannot provide unequivocal certainty, and data is derived from situations containing pre-existing biases that you might also not want to be carried on into future models or policy, for example.

As an example of potential data-driven policy biases, she illustrated the long-term increase in NZ government spending on the criminal justice sector and the high rate of incarceration. From the data it could incorrectly be inferred that crime was on the rise in NZ, when in fact it is decreasing.

“When you actually dig into the data you find that the increasing prison population was more a policy issue than anything else. You can track the rise in spend and the rise in prison populations to changes in New Zealand bail laws.”

“An over-reliance on metrics is something that we need to be careful of,” Ms Allen warned. “We absolutely want to be able to mind this data goldmine, but it comes back to managing the expectations of the policy makers.”

The potential of the IDI to provide an unparalleled level of detail to the New Zealand government is exciting. Yet it is instructive to learn from some of the lessons that the IDI has encountered, said Prof Jennifer Curtin.

The first elements of New Zealand's big data policy making began in 1997, with the IDI prototype being created in 2011. Various government decisions expanded on the scope of the IDI and now it holds 166 billion facts and is growing. It has also connected to a second database, the Longitudinal Business Database.

Yet it wasn't until 2015 that IDI stewards, Statistics New Zealand, actually asked New Zealanders about their trust in the platform and fostered this discussion about social licence. The survey revealed that there was a lot of trust in the platform.

“[Interviewees] were generally accepting that government would use it in the right way,” Prof Curtin said. “But they were really concerned about what it would mean for the stereotyping of different groups within society.”

The benefit of having connected government datasets, is in overcoming traditional silos...It can support a shift in the type of policy narratives that then underpin policy solutions

There is some potential of stigma and stereotyping... Therefore we need to think about cultural dimensions of data sovereignty



Whereas Ms Allen was optimistic that data could lead to a reduction in partisan policy-making, Prof Curtin warned that it was not always the case. Policy makers are beholden to the Minister of the day, and she offered the example of a Minister interested in interrogating social investment strategy using the data to justify fiscal austerity.

“A lot of people were really concerned about the stigma in the profiling that was going on with the datasets and the way they were being used.”

This concern was validated by one study using IDI data that found that tests of brain health in children as young as three could identify those individuals likelier to account for a disproportionate share of services across healthcare, criminal justice and welfare.

“As a result, the headline in the media was, ‘Future criminals revealed at age three!’ So there is some potential of stigma and stereotyping.”

“Therefore we need to think about cultural dimensions of data sovereignty and also communicating research for policy,” she emphasised.

The administrators of the IDI have actively continued to build trust in the system by talking to NZ’s indigenous people, and Prof Curtin acknowledged the work of Prof Tahu Kukutai on indigenous data sovereignty (Parallel 1.1) and Dr Mitsunobu Kano for his perspective on cultural context in science advice (Parallel 3.2).

Continuing the discussion of Big Data in action was Prof Pearl Dykstra, one of the seven Chief Scientific Advisors for the European Commission and Professor of Empirical Sociology at Erasmus University, Rotterdam.

She is also the Scientific Director of ODISSEI – the Open Data Infrastructure for Social Science and Economic Innovations in The Netherlands. Funded by the Netherlands Organisation for Scientific Research as well as the universities, ODISSEI brings together individual, business and academic data into an integrated platform akin to the IDI.

ODISSEI is open to the entire academic community, ministries and planning institutes of the government. The Netherlands has been ambitious in the types of data it is linking up, so much so that the administrators of the ODISSEI have encountered technical barriers resulting from the size of the datasets requiring special high-performance computers, particularly genetic data.

She offers the example of the National Twin Register that they have linked, with consent from the participants, to the National Registers.

It has been established that the proportion of people with schizophrenic tendencies is generally higher in urban environments. But what’s not known is whether it is the urban environment that makes them more prone, or whether there is a predisposition in the people who chose to move to urban environments?

“I can tell you that by linking these data to the information on residential moves, the answer is the second,” Prof Dykstra revealed. “People with a particular genetic makeup towards schizophrenia are more likely to move to urban centers, which of course has a lot of implications for how you treat people with schizophrenic tendencies.”

ODISSEI has also enabled researchers to map the social networks of individuals, including family,

There is a skill gap between many of the social scientists and the skills that are required to work with this data. And it’s not only a skills gap, it’s also a gender gap

colleagues, and school networks, with unmatched granularity. It reveals information about how mobile people are and whether people are expanding their opportunities or whether certain actions limit their opportunities. It opens up avenues for research that would otherwise have been impossible.

And all this can feed upwards into policy, with an aim to “put the social centre into policy-making.”

Yet the program has encountered the skill issues highlighted by Prof Carvalho. “There is a skill gap between many of the social scientists and the skills that are required to work with this data. And it’s not only a skills gap, it’s also a gender gap.”

“It’s mostly young men who are really into these techniques. And something very close to my heart is to get more women to also start doing these kinds of analyses!”

This conclusion underscores one of the themes running through the session: databases and endless reams of data are cold and unfeeling – the success of big data for policy making is not actually in the possession or processing of data, it is in remembering the humanity that underlies that data. Without appreciation of the person and the narratives, without a diversity of actors and tangible human skills, big data will not enable better policy making or garner public support.

The presentations segued into a dynamic discussion that began with the question of whether a policy makers needs to be able to differentiate between causation and correlation if the data provides a concrete social effect?

Another audience member questioned the use of the metaphor that ‘Data is like gold’ and that ‘Big Data is the new gold rush’, reminding people that data is not a natural resource but that it is derived from people. Is this kind of language unhelpful to humanising the data?

The success of big data for policy making is not actually in the possession or processing of data, it is in remembering the humanity that underlies that data

This sparked a lively discussion on both sides of the argument – that on one hand the metaphor does disassociate the data from the source. Yet on the other hand several panelists agreed that data is like gold and that the metaphor reminds us that data is not cheap to harvest, or store, or utilise and that there are costs and obligations involved in deriving value from data.

The panel was then asked how is possible to build trust in a system when the system is so complicated? To which, Prof Curtin was quick to invoke the presentation of Tracey Brown from Sense about Science, in saying that the public needs to be given credit for being smarter than we might think they are.

For Prof Curtin she has seen a narrative approach work really well, engaging people in dialogue. For Prof Dykstra the perceived trustworthiness of the system can hinge on the reputation of the organisation and it is critical to maintain that public reputation.

The discussion also raised the conundrum what about corporate actors wanting to use infrastructures like the IDI or ODISSEI for profit, particularly if these platforms integrate private sector data. This led to a conversation about whether explicit consent is no longer possible and, if not explicit, what does the model of social licence now look like.



PARALLEL SESSION 2.3

The Role of the Private Sector in Advancing the SDGs – Implications for Science Advice

Governmental and multilateral organisations often step in to lead when there is a market failure. In the case of the SDGs, such leadership is essential to kick-start the movement and ensure coordinated commitments, but is it a case of true market failure? Traditional firms in every sector are increasingly seeing for themselves that socially inclusive and environmentally sound actions are simply good business, while entrepreneurs are seeing opportunities in following public sentiment toward the SDGs.

Chaired by Aidan Gilligan, Director of SciComm – Making Sense of Science, the session recognised that at many conferences industry only tend to appear as the ‘necessary evil’ providing sponsorship but remaining difficult to engage. What, he asked, are the fundamental differences between industry, policy and science that need to be bridged? What opportunities are there for firms to lead? Are partnerships with government sufficient and how can we ensure compatibility between the needs of industry and the SDGs?

“Depending on who you believe, the estimates on the cost to reach the SDGs is between \$2.5 trillion and \$12 trillion per year. In terms of jobs that means 380 million new jobs. But what’s not spoken about at this conference and in general, is that it is a really big fist fight over who is going to get this money,” Mr Gilligan said of the inescapable tension that exists when working with the private sector. How can this tension be managed for the global good?

Dr Cyrille Schwob is Head of Technology for the Asia Pacific Region at Airbus. As a company, Airbus has good sustainability credentials and for many years has had a Responsibility and Sustainability Charter, the current version of which speaks directly to the SDGs. Dr Schwob also echoed the themes of the Urban and Smart Cities session (Parallel 4.2), in that the majority of work on the SDGs will have to be focused on population centres as the world urbanises. For Airbus this means that the sustainable cities of the future will need to integrate seamlessly with sustainable transport for a highly mobile population.



Make the goals outlined in the Responsibility and Sustainability Charter part of the company’s values, rather than just metrics...to report on

“We are very well aware that [Smart Cities] are not going to be something that is only an Airbus project. It is something that needs to be integrated with urban planning,” Dr Schwob outlined.

Society is changing, and younger citizens have a different concept of what a business should be. He quoted the Deloitte Millennial Survey that suggested 86% of Millennials believe that fundamental to a business should be a plan for the benefit of society.

“Even the investors, they have started to think not only in terms of financial return but how you contribute to society. The very famous example is the letter that Larry Fink [CEO of BlackRock investment] sent to all the CEOs saying, ‘We’ll be only supporting the companies that have a sense of purpose for society.’”

For Airbus, the way to marry the profit motive with social responsibility has been to make the goals outlined in the Responsibility and Sustainability Charter part of the company’s values, rather than just metrics they need to report on. When every employee understands that these values support the company’s bottom-line, then it becomes natural for the whole organisation to support change, Dr Schwob emphasised.

Airbus also hosts internal innovation competitions to garner ideas from their workforce, ideas that could be developed into sustainable solutions.

Another valuable power of industry, he noted, was that large international companies are extremely well placed to bridge the gaps between governments, banks, cities, SMEs and other multinationals to work collectively on problems. He examples the Urban Air Mobility initiative, lead by the EU to discuss how urban transport can become three-dimensional by using flight technologies in cities.

Yet action on the SDGs does not have to rely on will of individual companies; the aviation industry as a whole has committed to a cap on net aviation CO2 emissions (neutral-carbon growth) from 2020 and a 50% reduction in net aviation CO2 emissions by 2050.

So there are numerous ways that industry can be engaged in achieving the SDGs, part of which is normalising action across an industry, and promoting the perception that sustainable business is essential to long-term growth and profit.

In quite a dramatic change of tone, the next speaker was Mr Royston Braganza, CEO of Grameen Capital India, an impact-investment social enterprise.

“My intention is to be the bad cop for those people who are using the SDGs as a licence to talk and not as a licence to act,” he challenged the audience at the outset.

“I think it’s important for us to look back at the Millennium Development Goals. No one has mentioned them over the last 36 hours and I wonder why? People feel that they weren’t a great success,” Mr Braganza said.

“Is there something that went wrong that we need to learn from?...We cannot rely on government alone. We need to bring, in concert, all actors, whether it’s government, private sector, academia, science and technology, private wealth, philanthropic capital.”

As a guide for how to underpin talk with action, Mr Braganza redefined the INGSA acronym as:

- I – Impact Investing
- N – No one left behind
- G – Governance and policy
- S – Systemic Change
- A – Authenticity

For Mr Braganza, the most revolutionary element in achieving the SDGs is Impact Investing.

“Previously, there were two pockets of funding: Philanthropic funding, no returns expected; and private equity mainstream capital markets, capital commercial returns first.”

“What we’re seeing now is the evolution of a continuum. As an investor you can now look at anything on the continuum between all impact or all returns.”

“My dream is to create a capital with a conscience ecosystem. So 12 years ago, using Grameen’s brand, we launched the world’s first social investment bank, last year we launched a social tech company, hopefully in the next couple of years a social equity fund and then a social stock exchange.” In building a new ecosystem, it should be possible to connect the people at the top of the pyramid with those living in poverty at the bottom, to mutual benefit. The ecosystem can also address gaps and areas that governments and policy have historically struggled to address.

“If people are finding that they are out of the mainstream then they are going to vote with their voice, or with their feet, or probably worse still, with anger. Therefore we cannot afford to leave anyone behind...and this need is as much a business need as it is a government need,” Mr Braganza said.

Governance and policy is also critical, the government can’t just step in when the market fails – it is in the interest of the government to foster a culture of innovation that’s inclusive and that means the people at the top being able to learn from those at the bottom.

“We seem to specialise in talking down and giving policies and recommendations, but how many people are really listening to the poorest of the poor, listening to what really works for them, so that we can create something that makes sense for everybody?”

“I was a little frustrated yesterday listening to some of the session because everyone seemed to talk about what science can do in the future...It’s not about the future, it’s about now. It’s about people today that are suffering.”

Create a capital-with-a-conscience ecosystem...we launched the world’s first social investment bank, last year we launched a social tech company, hopefully in the next couple of years a social equity fund and then a social stock exchange

Government can’t just step in when the market fails – it is in the interest of the government to foster a culture of innovation that’s inclusive

He also warns against industries that adopt SDG principles outwardly, but behind the scenes, nothing has changed. First their was 'Green-washing', next there was 'Impact-washing'; are we going to see tomorrow, 'SDG-washing'? There needs to be a way to measure the impact.

In this respect he has seen a move away from input-funding to outcome-funding. Rather than building a school or a hospital, impact-investors are asking about how much funding is required to keep x number of kids in school, or funding a given reduction in mortality rates. Very specific funding of outcomes.

"That is the role that corporates and private sector need to play – How do you bring the market to support policy and government?"



Also addressing the role of finance in achieving the SDGs was Mr Kenichiro Yamaguchi, Senior Manager at CDP Worldwide-Japan. CDP is a global reporting system and a UK-based non-profit. Over 6,000 companies reported environment data to CDP in 2017, and more than 600 of the world's leading investors support their activities.

Companies can report against three streams: climate change, water security, and forest commodities.

"There are two ways to encourage companies to respond to CDP. On the request of investors we send our environmental questionnaires to companies... The other way is supply chain," Mr Yamaguchi explained.

"Some of the big global procurers such as Wal-Mart joined the CDP supply chain program. On behalf of these members, the CDP sent our questionnaires to their suppliers. Now 115 big procurers are participating in the program."

With CDP's questionnaires directly linked to the SDGs targets, CDP data is used to monitor the progress of the goals. It can also track the increasing number of businesses that are setting their own long-term targets. Of CDP participants 89% of them have emission reduction targets in place and indicates that long-term target setting has become a standard business practice.

"RE100 is an initiative to chase 100% renewable energy and now more than 150 companies have joined... Apple and Microsoft have already achieved 100% renewable energy."

Data from CDP also shows that 32% of their reporting companies have introduced internal carbon pricing and are evaluating climate-related risk, which is vital to establishing sustainable economics in a climate-related economic model.

Not only is environmental reporting necessary to understanding trends and to track progress on the goals, it can also promote action through supply-chains and investor engagement, to help create an industry culture with a conscience.

To close out the presentations, the session heard from another industry representative, Mr Hiroshi Ueda, Director and Senior Managing Executive Officer at Sumitomo Chemical Company.

For Mr Ueda, industry can primarily drive change through innovation and providing solutions. Japan has previously overcome issues of pollution, resource and energy limitation but creating environmental protection policy or supplying innovative solutions to market.

"Now as global-scale issues pile up, including the response to global warming and the creation of a circular economy, we believe that the chemical industry can deliver solutions to these under the SDGs," he said.

For example, chemical companies like Sumitomo can accelerate a move away from combustion transport towards electric cars by enhancing the energy density of batteries, or providing lighter auto-body parts. Echoing the industry-wide initiatives illustrated by Dr Schwob from Airbus, Mr Ueda introduced the concept of Carbon Life Cycle Analysis, advocated by the International Council of Chemical Associations. It describes the entire lifecycle of CO₂ emitted at each stage of the process from raw material, through manufacture, to recycling or disposal.

To achieve the Paris 2-degree goals and a smooth transition to a carbon cycle society, new supply chains and social infrastructure need to be created

“To achieve the Paris 2-degree goals and a smooth transition to a carbon cycle society, new supply chains and social infrastructure need to be created and our lifestyles need to be changed through collaboration with industry, government and academia,” Mr Ueda concluded.

“I believe the chemical industry would like to play a positive role in advancing the agenda by bringing innovative products to the world and thus contributing to the SDGs realisation.”

To kick off the discussion section one questioner asked: It is all very well to discuss the role of large multi-nationals, but what of SMEs? How can SME’s help address the SDGs when they have to focus on their bottom line? What are the low hanging fruit for them to address sustainability.

Mr Braganza: “One is supply chain. As large corporates decide that the SDGs is their way forward, you will see the need for them to work through their supply chain and SMEs tend to be feeders into that, either at the supply side or the distribution side.”

He also highlighted a sandbox approach to innovation, where SMEs can experiment with an SDG to try and build a business model around it and to test that model. This potentially opens the doors to angel investors and other finance. Finally he suggested collaborating between SMEs and creating a financing product, for example social impact bonds for investment.

“So where does the funding come from, how can innovation get funded and how do you plug into the supply chain, I think are three ways where SMEs can play.”

A subsequent question referenced the STI for SDG discussion from Day 1 of the conference, and whether industry would see value in participating in roadmapping exercises at a country level, rather than just international level?

There was also a question on how to encourage the banking sector in other Global South countries to change their paradigm towards impact investing.



PARALLEL SESSION 3.3

Structural Considerations for Science Advice in Public Policy – From Embedded Science Advice to Open Science

Science advice has come a long way. As Dr Vladimír Šucha pointed out in his keynote on Day One of INGSA2018, the understanding and potential of science advice, its shape, structure and methods, have all evolved dramatically and will continue to evolve for a rapidly changing world. The structural element of science advice is critical to how accessible, visible and accepted it is, yet has science advising become an institutionalised role? Is it now a profession? Must there be a recognised advisory mechanism or is an ad-hoc approach sufficient and cost effective?

Chaired by Ms Anna-Maria Arabia, Chief Executive of the Australian Academy of Science, the session looked at the explicit and implicit elements of science advisory structures within governments, transnational entities, and sub-national advisory mechanisms and how these can operate in a cohesive way.

Framing the discussion, Ms Arabia underscored the diversity of approaches that countries take on how they structure the pipeline of evidence to policymakers. And just as no one country does it 'right', no one institution or organisation is sufficient to satisfy a government's need for high quality, evidence-informed advice – hence it will only ever be a combination of different bodies and approaches that will have to work together in concert to be effective. There are also various tensions between the role of formal versus informal advice, and how to marry the two for maximum effect.



Yet when it comes to the complexity of facilitating evidence into policy, the European Commission is the prime example of integrated mechanisms of evidence synthesis, evaluation and provision. Dr Johannes Klumpers is Head of Unit of the European Commission's Science Advice Mechanism (SAM).

On top of their day-to-day business, the European Commission (EC) has a couple of tasks: proposing legislation; verifying the implementation of legislation; and upholding EU treaties. 70 to 80% of the science advice used in the EC is primarily for the development of legislation, Dr Klumpers said, while the remaining portion tends to be to support implementation and to assist with crises.

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For the EC, science advice is derived both internally and sourced externally. The Commission is made up of different Directorates, overseen by Director-Generals. These function much like ministries and many of them have their own science advice capacity. The Commission also has a dedicated science and knowledge service, the Joint Research Centre that has more than 1000 researchers working on topics of interest across the Directorates.

The EC is also set up to accept advice from external partners, such as the European Food Safety Authority that provide expert data necessary for decision-making.

Also sitting beyond the boundaries of the EC, despite being an initiative of it, is the Scientific Advice Mechanism (SAM), that Dr Klumpers heads. The SAM brings together external experts, in the form of their Group of Chief Scientific Advisors, who provide completely independent advice to the highest level of the EC, directly to the Commissioners. As well as responding to requests, it is also within their remit to propose topics they believe the Commission should consider.

Another element of the SAM is the Science Advice for Policy by European Academies (SAPEA) group, a consortium of European academies that enables the feeding in of science evidence into the mechanism and to the Chief Scientific Advisors.

For the SAM transparency is critical, and the decision was made to only use publicly available evidence, despite this limiting the types of advice they can provide.

"It allows us to be open and transparent about the whole process. For each scientific opinion that is provided the whole chain of how the decision has been taken, how the evidence was analysed, can be traced on the website, can be questioned by people," Dr Klumpers explained.

The benefit of this high level of integration, the pro-evidence culture of the EC, and the integrity of the advice provided, means that a high level of impact is generated from advice provided by the mechanism. The influence of this process is seen to directly impact the resulting policy output.

While the European Commission has ample resources to implement mechanisms such as this, for small countries, effective action demands prioritisation.

Professor Mark Ferguson is the Director General of the Science Foundation Ireland, and Chief Scientific Advisor to the Government of Ireland. He recalled a time before Ireland's economic crisis when the government had an independent office of the Chief Scientific Advisor.

Yet after the crisis the government evaluated every function against value for money. "The first thing they decided was to abolish the Chief Scientific Advisor's office. So that tells you something about how the effectiveness of that office was perceived," Prof Ferguson said.

The Government of Ireland wanted to keep the function, but not the cost, of the office. So in 2012 Prof Ferguson was appointed the head of Ireland's science funding agency, and also given the title of Chief Scientific Advisor.

"I am paid no extra salary, I have no staff and I have no budget...I am the most cost effective chief scientific advisor in the world."

Ireland, like most small countries, encounters the issue of possessing only a small number of experts in any field. As a small country with limited resources Prof Ferguson's solution has been to rely on the work of other nations.

"We do not do reports. The world is awash with reports...We look at those reports and we then contextualise them for the individual ministries in an Irish context...So I think that formal part of scientific advising is relatively simple," Prof Ferguson said.

"The officials know that when I meet with a minister, the first question I'm going to ask on any specific topic is: 'Have you read this international report?'. And when they know that, they don't want to look foolish, so they will make sure that their people have read that report."

"The whole objective of the exercise is not for me to be telling people what to do, it's to inculcate that practice of looking for the best possible advice!"

It is also critical to provide policy-makers with a multiplicity of views, including reports, other policymakers, local experts. Policy-makers will face inputs from any number of invested stakeholders, so it is important to make sure that the scientific side can also offer a spectrum of opinions, even if they differ from one another.

In Irish policymaking there is now a requirement to reference where the policymakers received their information from – enabling insight into the various influences on the process and validating the introductions that Prof Ferguson makes.

Decision makers might ask 'Where is the evidence?' but they are unlikely to ask, 'Where is the evidence that has been synthesised?'

"The most important thing I do, is when I go to see people proactively and I say, what are you currently working on, what is it that's bothering you, what's your top priority and how can I help?"

"That's very important because it's informal and it's early and it's in a trusted relationship...but it's not advice; this is where you should go to get the advice, but if you're looking for something now, here is an opinion," Prof Ferguson emphasised.

Echoing Prof Ferguson's comments about there being a surfeit of reports but a need to contextualise them for policy, Dr Claire Craig, Chief Science Policy Officer at The Royal Society, began by stating that the task of creating policy-relevant knowledge remains under-supported, poorly regarded and unrewarded.

"Evidence synthesis, what is it, what are the conditions under which it is easy to get together scientists from different disciplines to create knowledge that is relevant to particular policy topics, what can we do to make that happen more frequently?" Dr Craig challenged the audience.

Every year there are over 2 million new academic paper; the job of synthesising knowledge within a discipline is hard enough, let alone across disciplines as well as including the arts and humanities.

Provide policy-makers with a multiplicity of views...it is important to make sure that the scientific side can also offer a spectrum of opinions, even if they differ from one another.

“So the challenge is about making a market, trying to create conditions under which more scientists are keen to contribute to this kind of knowledge, and in which policymakers are more ready to reach out for it.”

It is a problem of both funding and perception, Dr Craig said. “Evidence synthesis is not generally funded, it’s also not what you go into science to do, which is to create new knowledge.”

Meanwhile on the other side of the policy fence, ministers and decision makers might ask ‘Where is the evidence?’ but they are unlikely to ask, ‘Where is the evidence that has been synthesised?’ because it is much more unlikely that there will be any.

In collaboration with the Academy of Medical Sciences, The Royal Society undertook a project to summarise the principles of good evidence synthesis, to make it seem less of a fearful thing and less of a complicated task to approach.

The four principles they derived are:

- **Inclusivity:** You need to be inclusive in two directions – across research disciplines and also inclusive of your client.
- **Rigour:** The very best mechanisms of synthesis involve thousands of scientists over many years, not only providing on-off reports but constantly refreshing their knowledge in a way that is really visible so that policy makers automatically know where to turn. Examples are the IPCC, Cochrane and Campbell collaborations.
- **Transparency:** This encompasses conflicts of interest, sources of knowledge, methodologies. Being open about methodologies is particularly important when trying to bring together multi-disciplinary evidence, as it will come from scientists and disciplines that have very different ways of working, different conceptions of academic rigour, and different ways of defining ‘good’ science.
- **Accessibility:** “That’s very much about being in the language of the audience.” One benefit of bringing together scientists of different disciplines is that most of the time the only common language that they have is that of the public, which can make those conversations easier to translate into outputs suitable for ministers of the public.

This appreciation for knowledge was immediately picked up by the following speaker, Dr Doyin Odubanjo, Executive Secretary of the Nigerian Academy of Science and Chair of INGSA-Africa.

“It’s interesting to note that in Africa, knowledge is cherished and has a long history of being cherished; the oldest continuously running university in the world is said to be in Morocco,” Dr Odubanjo began.

“In recent times there’s been an increase in attention on academies to be the providers of science advice on the continent. In 2001 there were 10 who were part of what is known as the Network of African Science Academies. Now there are 24 official members, with many more not yet registered.”

For the Nigerian Academy of Science it has been valuable to establish, via their statutes, a channel to the highest level of government, appointing the president of the country as the grand patron of science. While actual access to the president has changed depending on who inhabited the role, this legacy has helped legitimise the Academy’s access to high-level officials.

The 4 Principles of Evidence Synthesis:

**Inclusivity; Rigour;
Transparency;
Accessibility**



This high-level, trusted relationship has yielded unique opportunities, in which the Academy was invited to assess agencies and research institutes existing under the Federal Ministry of Science and Technology, and provide feedback to optimise their performance.

“So this was demand driven, this was just the kind of thing we wanted. This also showed that our work over the years was beginning to be recognised, the Academy was being seen as a proper evidence broker that could be gone through for independent science advice,” Dr Odubanjo recalled.

Yet, illustrating the frustrating nature of working with the political class, by the time the report was handed in, the Minister had changed and was disinterested. Even so, the report did manage to filter up to the presidential level and was utilised in a review of all the federal agencies.

One of the key players in institutional science advice is, of course, the university sector, one of society’s key knowledge generation mechanisms. Yet they also face challenges in providing the right information, at the right time, in the right way to be useful to policy makers.



Mr Gavin Costigan is the Director of Public Policy at the University of Southampton and inaugural Chair of the University’s Policy Engagement Network. For Mr Costigan, the disconnect between knowledge generation and translation into policy advice, is partially a lack of institutional incentive.

“If you’re in university, you’re really there to teach, you’re there to do research and fairly recently, over the last 20 years, it’s been okay also to be working with business,” he said.

“But these are the only things that you can get money for, these are the only things that you can get recognition amongst your academic peers for, these are the things that you can get promoted for, these are the things that therefore drive the academic career.”

This is a major factor in why many academics do not prioritise working with policymakers. Another reason is a lack of skills – how to interact with policymakers is not something that is traditionally taught when training academics.

And those researchers that do actively seek out policy-facing opportunities, tend to be doing it individually as there is a lack of structured mechanisms within the university system to help them.

Yet things are slowly changing, Mr Costigan said, in the UK at least. Many universities are beginning to bring in specialist support units to do some of this policy work alongside academics. He draws the comparison to the commercialisation drive that took place 20 to 25 years ago, where universities created units to help academics work with business.

These policy-impact units can work bottom-up with researchers to help them identify areas of potential impact, and they also work top-down, with policy-makers, identifying needs and questions that the university might be able to assist with.

“What’s driving this trend in the UK? It’s a number of different things. One of the things that’s driving it is cash. The government has decided it wants to get more policy impact and it is beginning to put money towards that.”

By instituting a research-impact assessment into its funding models, the government is driving an appreciation within the system for those who can translate knowledge into policy relevance. Other grant schemes have also added the provision to apply for funds to undertake impact activities.

The disconnect between knowledge generation and translation into policy advice, is partially a lack of institutional incentive.

PARALLEL SESSION 4.3

The Local is Global – The Intersection of Science Advice and Science Diplomacy

Science Diplomacy is an increasingly appreciated and mobilised skill that countries can use to as a tool to support the achievement of their diplomatic goals. Science is one of humanity's truly global, egalitarian endeavours, transcending borders, languages and cultures – it is therefore uniquely placed to assist with international relations. Yet how can it be deployed ethically and effectively? What are the points of convergence and the tensions between the distinct disciplines of science and diplomacy that practitioners must consider? How does science diplomacy operate across jurisdictions and levels of governance to help progress the SDGs? The panel brought together some of the world's most respected minds on the topic.

First to speak was Prof Paul Berkman, Director of the Science Diplomacy Center at the Fletcher School of Law and Diplomacy, Tufts University.

The world is broken up into regions, Prof Berkman began, the most obvious of these are the nation-states that interact with each other across their jurisdictional borders. Yet about 70% of the earth's surface falls outside of these jurisdictional borders, areas that have been defined as international spaces under international law – the global commons.



These global commons are also tied into the planetary scale challenges that we face, such as global warming, biodiversity loss and ocean health. Effective action to manage these commons and the challenges facing them are dependent on a number of things. One: International consensus and action; Two: Evidence underpinning this international action; Three: The ability for these actions to operate across generations.

Since the Treaty of Westphalia in the 1600s, the nation has been the basic jurisdictional unit... but today we have cities that have the capacity and size and operational clout of nations

Science diplomacy is critical to all three elements, Prof Berkman emphasised. "It is a methodology that embodies a process of moving from questions, to data, to evidence, to options, to informed decisions that build common interests. And so, the engagement of stakeholders isn't what happens when the scientists suddenly come up with their data and introduce it to the decision makers. It's a process that engages the decision makers throughout."

Yet, Prof Berkman warns, the 'international landscape' is becoming more complicated, particularly as cities become international players alongside their home nations.

"Since the Treaty of Westphalia in the 1600s, the nation has been the basic jurisdictional unit...but today we have cities that have the capacity and size and operational clout of nations."

"In Boston, where I live, there are 65 consulates. Not the embassies of these nations, but consulates. These consulates represent direct touches to the foreign ministries of 65 governments around the world... there is a bridge between the international and the subnational...And cities have an advantage, they're not encumbered by the geopolitics that nations are."

This directly links the local to the global, and is a model that should be developed, said Prof Berkman. Even though it does complicate the international diplomacy landscape, it is a powerful tool for the local operational level of society to influence the global agenda.

The next speaker was Prof Teruo Kishi, Science and Technology Advisor to the Minister for Foreign Affairs of Japan, drawing upon his own career to illustrate the manifold nature of the science and diplomacy interface.

"The basic concept of science diplomacy consists of three parts; science in diplomacy, diplomacy for science, and science for diplomacy" Prof Kishi explained. To this, he added the science of diplomacy, the discipline of studying how diplomacy works.

This can further be broken down to a number of actions that cut across these three parts: actions for national needs; actions for cross-border interests; and actions for global needs and challenges.

**Science in Diplomacy;
Diplomacy for Science;
Science for Diplomacy;
the Science of Diplomacy**



In his role as S&T Advisor to the Foreign Ministry, much of his work fell into the category of ‘science in diplomacy’, offering science advice to the Foreign Ministry on diverse issues from the Arctic to enhancing science and technology standards in Africa. Science directly informed the Foreign Ministry to help enact their international agenda.

“Next I move to my active public relations, the promotion of Japan STI. This I can call ‘diplomacy for science’...I have encouraged cross-ministerial collaborations for outreach activities and conducted overseas outreach to benefit Japanese science,” Prof Kishi said.

“The third one is how to build networks, such as FMSTAN and INGSA. This is ‘science for diplomacy’, using the international power of science to bring people together to create diplomatic opportunities.”

Across all these elements, in international relations, it is necessary to maintain a careful balance between customisation and commonisation, he said. Customisation is tailoring solutions uniquely to each nation; commonisation is the ability to seek global harmonisation.

For a country’s foreign policy to be effective each country has to pursue solutions that are specific to their own needs, while at the same time having to harmonise for their solutions to tackling global issues.

While it is valuable to know the many ways that science can engage with the diplomacy space and influence international policy, it is also important to consider what science diplomacy looks like from a practitioner’s side.

Ms Dalia Kreivienė, is Deputy Director of External Economic Relations and Economic Security Policy Department at Lithuanian Ministry of Foreign Affairs. As a diplomat, science plays a number of roles that are perhaps subtly different to the priorities of scientists.

Firstly, science and technology have a growing role in international relations in part due to the growing prevalence of technology in our lives – many traditionally diplomatic issues will now have a technological component.

In international relations, it is necessary to maintain a careful balance between customisation and commonisation... Customisation is tailoring solutions uniquely to each nation; commonisation is the ability to seek global harmonisation.

Lithuania does not have an S&T advisor as part of their framework...they hope for science diplomacy to become a latent diplomatic skill rather than a specialised role.

“The second point is the importance of science and technology in terms of competitive advantage between countries,” Ms Kreivienė said.

“At the same time, we see global challenges that call for even closer cooperation in science and technology to help traditional diplomatic efforts to tackle those cross-border emergencies and global issues.”

While it is complicated to embed science diplomacy into the institutional framework of the Ministry of Foreign Affairs, strong political leadership and a broad belief in the value of science diplomacy can make it successful.

“Recently, our parliament adopted long-term science and innovation policy guidelines and in these guidelines we see that there is a willingness and understanding to ensure better policy coherence among STI institutions, and we should ensure better synergy with diplomacy on international activities.”

As an example, Lithuania has a Strategic Council for Science, Technology and Innovation, which is chaired by the Prime Minister, and includes almost all of the government ministers, relevant outside institutions and business. Two years ago, the Minister of Foreign Affairs was asked to join the council, illustrating the growing role of science in their international diplomacy.



In contrast to other Ministry of Foreign Affairs, Lithuania does not have an S&T advisor as part of their framework. Rather, the ministry understands that science diplomacy is beyond the scope of any individual institution, and therefore it is critical for the ministry to use its expertise to establish networks and good coordination. In this way, they hope for science diplomacy to become a latent diplomatic skill rather than a specialised role.

Oman is another small country eagerly trying to build up their science diplomacy capacity, within their own country. It was only in 2015 that the Omani Ministry of Foreign Affairs created the Office of Science, Knowledge and Technology Transfer, indicating a growing understanding of the importance of science within the diplomatic service.

Dr Yousuf Al-Bulushi was chosen to head the new Office, and when he came into the job, he admits, he knew nothing of science diplomacy. Coming from a technology transfer background he quickly realised the potential onward value of science to the Ministry and was an early member of FMSTAN, a global science diplomacy network that he now chairs.

The establishment of the new Office came in the same year as an oil-price crash ripped through the Omani economy, an economy 80% dependent on the oil-price.

“You can imagine that within the crisis, nobody would listen to you unless you come up with some tangible solutions and that was the challenge...So we began organising a workshop for high-level policy makers, which was the first workshop being conducted in Oman in such an area,” Dr Al-Bulushi explained.

“We succeeded in bringing 25 ministers into one room to only think about the role of science diplomacy in achieving Oman's priorities, such as around the future of disruptive technology.”

“One of the outcomes of this was establishing the so-called National Committee for the Future.”

This foundational initiative helped pivot the country's priorities towards the potential benefits of establishing new high-tech, knowledge-based industries for Oman. It resulted in sending thousands of students abroad to study, to help equip the nation with new ideas, and underpinned an international blockchain symposium in 2018.

Within six months of the blockchain symposium Oman was home to 23 small blockchain-based start-ups and including 110 expert programmers.

“So as a result of this blockchain example, we have shown that science diplomacy can not only talk the talk, but walk the walk. Next we've actually been asked to lead the national strategy towards achieving economic diversification.”

The next stage of this was the Ocean Economy and Future Technology conference that took place in February 2019, and at which INGSA and FMSTAN played an important part. The conference once again embedded science diplomacy at the heart of broader issues, in this case, the sustainable Blue Economy and the ongoing diversification of the Omani economy. The event was a great success and showed the utility of framing important issues using science diplomacy as a lens, to deepen the discussion around international engagement and cooperation.

It also hosted the inaugural meeting of INGSA's new division on Science Policy in Diplomacy and External Relations – the SPIDER network.

The next panelist, Dr Franklin Carrero-Martínez, was an integral part of setting up the SPIDER network and is the Director of its Science and Technology for Sustainability Program in the Policy and Global Affairs Division at the US National Academy of Science, Engineering and Medicine.

The conference once again embedded science diplomacy at the heart of broader issues, in this case, the sustainable Blue Economy...and showed the utility of framing important issues using science diplomacy as a lens

He reminded the audience that despite the current enthusiasm for science diplomacy, the field is not new, with science having played incredibly influential roles at the highest levels of international politics. What has changed are the modes and speed of the impact.

Despite the current enthusiasm for science diplomacy, the field is not new...What has changed are the modes and speed of the impact.

“The Minamata Convention of Mercury. The scientific discovery happened in the 1950s...1956 they identified what was the cause. In 2013 countries signed the convention, and in 2017 the convention entered into force. It took 56 years between discovery and action,” Dr Carrero-Martínez said.

“They started studying the role of CFCs in the atmosphere in 1973; in 1985 there was independent confirmation by NASA. In 1987 the protocol was signed and in 1989 it entered into force. It took 14 years between discovery and action.”

“The important question is why does it take so long between discovery and action?”

When looking at what can be done to facilitate the effectiveness of science advice on diplomatic outcomes, the United States provides a highly developed example.

Dr Carrero-Martínez was an academic neurobiologist when he entered the AAAS fellowship program that embedded him in the Department of State. He was posted as a science attaché to the US embassy in Mexico City, learning on the job the requirements of a good science diplomat. He then eventually ended back at the Department of State, employed in the same office in which he was a fellow.

The strength of this is in the pipeline that can connect scientists to policymakers via programs that can upskill them, and place them into willing sections of the government or Foreign Service that appreciate the value of evidence.

The success of this is increasingly being augmented by additional on-ramps for scientists to get into diplomacy, including more available training schemes and embassy science fellowship programs, Dr Carrero-Martínez concluded.

The discussion was then lead off by a question about the shrinking of time between discovery and action. Dr Carrero-Martínez brought up the important, and often neglected, topic of the private sector.

“The private sector is the one that ultimately will make all of these things sustainable, so we need to engage and in academia, we tend to demonise the role that scientists play with the private sector.”

“Once you have that alignment between the scientists and the private sector, there has to be alignment with government in order to enable policies, in order to enable things that will allow some of these discoveries to move forward and become a reality. So I think there has to be a coincidence of things.”



To this, Ms Kreivienė offered a practical response for how to assist reducing the time between discover and action: “Provide explanations to the politicians of the impact of these discoveries and preferably translate this impact into figures, because politicians like quantitative explanations and they very much like if it brings some additional political benefits.”

For Prof Berkman, the lag between discovery and action is often necessarily long, because of what you are trying to do.

“The challenge at a global scale is one of balancing national interest and common interest. And the single greatest contribution of science diplomacy is in its capacity to build these common interests, despite it being the most difficult element. If there is no common ground then it is difficult to inspire action,” he said.

The challenge at a global scale is one of balancing national interest and common interest. And the single greatest contribution of science diplomacy is in its capacity to build these common interests

KEYNOTE 4 - HON DR EUGENE MUTIMURA

Minister of Education, Republic of Rwanda

The Honourable Dr Eugene Mutimura is the Minister of Education for the Republic of Rwanda. While it is only a country of 12 million people, Rwanda is rapidly becoming one of the most progressive science nations in Africa, having made science and innovation central to its national development strategies.

It is also regarded for its high level of female representation in government with 68% female MPs, and 50% women in Cabinet. The country's GDP has increased three-fold since 2002.

"The overall goal is that our country becomes a knowledge-based economy changing from agricultural-based economy over time," Dr Mutimura explained. "So it's believed that the role of Science, Technology and Innovation is very critical to changing the lives of our people."

This role of science as key to becoming a middle-income and high-income country has been enshrined in Rwanda's various national agendas looking to 2020, 2035, and 2050.

"In 2005 the cabinet approved a National Policy on Science Technology and Innovation," Dr Mutimura explained.

"And this is being reviewed in order to be in alignment with various national agendas...particularly the National Strategy for Transformation....but also supporting the achieving of the SDGs."

These strategies are also aligned with the African Union's Agenda 2063. One of the repeated themes of INGSA2018 was the need for science and governance to interact between local, national, regional and global levels. In aligning national and continental strategies, Rwanda is putting these goals into action.

As the Minister for Education, Dr Mutimura's department is the overseer of the strategy building Science, Technology and Innovation capacity in Rwanda. One of the key outcomes of this has been that the government decided to launch a National Research Innovation fund with a \$30 Million grant.

"Because policy alone is not important, actions are more important," Dr Mutimura said.

While the country welcomes international partnerships and collaborations, one of the key elements of this capacity building strategy is that to access grants the most important criteria is that researchers are working with Rwandans.

One of Dr Mutimura's other strategies to rapidly increase science capacity in the country is to institute a high level of STEM education from childhood through to tertiary. This is assisted by a government commitment that ensures technological infrastructure keeps pace with their aims, such as rolling out 4G technology in keeping with their ICT in Education Master Plan.

Rwanda is rapidly becoming one of the most progressive science nations in Africa, having made science and innovation central to its national development strategies



“At the tertiary level we have made a decision to establish and support Centres of Excellence in specific fields.”

“We have what we call Kigali Innovation City, which is housing many of the universities and centres of excellence, mainly around several platforms: technology, human capacity development, innovation-friendly financing.”

Rwandans are also proud of what they call ‘home-grown solutions’ that are cultural practices that inform policy and practice, through the involvement of the community.

Examples are:

- Umuganda – ‘Community Work Days’ that have resulted in work equivalent to 38M USD
- Ubudehe – the Rwandan practice and culture of collective action and mutual support to solve problems within a community
- Girinka – the ethos of ‘One Cow per Poor Family’ that has seen more than 183,000 cows distributed since 2006
- Or, more famously, the traditional Gacaca courts that we revived following the Rwandan Genocide in 1994.

Rwandans are also proud of what they call ‘home-grown solutions’ that are cultural practices that inform policy and practice, through the involvement of the community

Rwanda’s aspirations are lofty yet the country still faces challenges.

“We have not been able to promote enough research outputs, we have not had enough scholarships to our youngsters,” said Dr Mutimura, “so I was very delighted to talk to Dr Rémi Quirion that the Québec government is going to sponsor students in artificial intelligence, quantum computing, and internet of things.”

Rwanda has also previously not attracted enough foreign investment. But, Dr Mutimura said, with the signing of the African Continental Free Trade Agreement Area, it is likely that the creation of a single trade market will open up greater opportunities to attract investment and research collaboration.



One novel initiative that Rwanda has embraced, is to open the country up to businesses wanting proof of concept on their technologies.

“You may have known about the Zipline contract we have - drone technology assembled in Rwanda to transfer blood to various parts of the country. This has had a very good impact on reducing maternal mortality rates.”

“And we are signing another contract with Zipline, to deliver medicine and other technologies.”

As well as having a contract with Volkswagen and another with Andela, in 2018 Rwanda signed an MOU with Alibaba Electronic World Trade Platform to do trade between Rwanda, Africa and China.

In the discussion, following Dr Mutimura’s presentation, the issue of leadership came up, to which Dr Mutimura felt the need to explain the unique role of ministers in Rwanda.

“In Rwanda ministers are not political figures, they are more or less technical figures; 50% technical work – 50% political work...That’s why we see that most of them are young, I am one of the oldest ministers in Rwanda.”

Sir Peter Gluckman, in a comment, also highlighted the 2018 Rwanda workshop as the best INGSA workshop that he has attended and that their topic interests and discussion showed a very multi-disciplinary approach. He congratulated Rwanda on their work.

DAY ONE TUESDAY 6TH NOVEMBER

Time	Program	
08:00-08:30	Registration	
08:30-09:00	Opening Session	Sokairo Hall
	<p>Opening remarks : Teruo KISHI, Science and Technology Advisor to the Minister for Foreign Affairs of Japan</p> <p>Welcome remarks : Akihiko TANAKA, President, National Graduate Institute for Policy Studies (GRIPS)</p> <p>Welcome remarks : Michinari HAMAGUCHI, President, Japan Science and Technology Agency (JST)</p> <p>Greetings : Kazuhiko TAKEUCHI, Vice President, Science Council of Japan</p> <p>Presidential address : Sir Peter GLUCKMAN, Chair of the International Network for Government Science Advice (INGSA), Former-Chief Science Advisor to the Prime Minister of New Zealand, International Science Council President-elect</p>	
09:00-09:30	Keynote Speech I	Sokairo Hall
	<p>Rt Hon. Helen CLARK, Former Administrator of United Nations Development Programme (UNDP), Former Prime Minister of New Zealand</p>	
09:30-11:00	Plenary Session I: SDGs and the science-policy interface	Sokairo Hall
	<p>The Sustainable Development Goals (SDGs) are a critical framing device for progressing both national and the global agendas. In nearly all of the SDGs, natural science, social science, data science, technology, economic and political science, and particularly implementation science will be needed. This session will explore the ways that science relates to the SDGs. Aspects such as, how science can help deliver the SDGs, the changing scientific and technological context in which the goals must be considered, and how to use science and the science-policy nexus and science diplomacy to better integrate the SDGs into domestic policy.</p> <p>MODERATOR Yuko HARAYAMA, Professor Emeritus, Tohoku University</p> <p>SPEAKERS Matthew WALLACE, Senior Program Officer, International Development Research Centre (IDRC)</p> <p>Daya REDDY, President, International Science Council (ISC)</p> <p>Klaus TILMES, Senior Advisor, Science Technology and Innovation, World Bank</p> <p>Michiharu NAKAMURA, Counsellor to the President of Japan Science and Technology Agency (JST)</p> <p>Rt Hon. Helen CLARK, Former Administrator of UNDP, Former Prime Minister of New Zealand</p>	
11:00-11:30	Coffee Break	



Parallel Session Streams

Stream 1: Science Advice in an era of Technological and Societal Transformation

Human innovation and ingenuity has both upsides and downsides, especially at scale. How can risks and challenges be mitigated and benefits maximised? This stream will examine the role of science advice in bridging the multiple conversations required.

- 1.1: Human wellbeing in a digital age – Are new measures and considerations needed in the face of pervasive technology?
 - 1.2: Technological risk management – Dealing with uncertainties, risks, trade-offs and human values
 - 1.3: Big Data transforming policy-making – What are the opportunities and challenges?
-

Stream 2 : Science Advice and the Sustainable Development Goals

The Sustainable Development Goals (SDGs) provide a framework for truly joint, global action on our shared challenges. The SDGs require not only new knowledge but also radically new systems and approaches. These sessions will examine the types of knowledge that are required to help advance the SDGs and how such knowledge must be framed and mobilised in innovative new ways.

- 2.1: The role of arts, humanities and the interpretive social sciences in advancing knowledge advice for the SDGs
 - 2.2: Mapping critical policy nodes – Identifying the articulation points between interacting SDGs and domestic policy priorities
 - 2.3: The role of the private sector in advancing the SDGs – Implications for science advice
-

Stream 3 : The Future of Science Advice

Science advice has never been so important. At a time when the use of 'evidence' to guide public policy can be so openly revered and reviled, trusted and tested – depending on one's political position – there has never been a greater need for it. Yet, the position of science advisor or science advisory mechanisms is vulnerable sitting as it does between science and public policy, and largely between facts and values. In this in-between, it is important to maintain the trust of parties who do not always trust each other. While the position requires a distinct set of skills and experiences, there is no formal training for this brokerage and often structural barriers prevent it functioning effectively (in both science and policy sectors). These sessions will look at the future of science advising and the skills needed. What are the implications of institutionalising these? Who are the next generation advisors and will they want the job?

- 3.1: Building trust between evidence brokers and multiple audiences
 - 3.2: Skills development for evidence brokerage
 - 3.3: Structural considerations for science advice in public policy - From embedded to open science
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Stream 4 : Contexts and Case Studies of Science Advice

Science advising is often discussed in the abstract, by way of principles and practices. Putting these into context can provide a better way to share experience and lessons. This is especially important because the practice of science advising is highly contextualised. The advisor or advisory mechanism can quickly become a decision-maker in crises, for instance. Science advice to local officials may need to confront more immediate and direct democratic processes than at other levels, but may also have more immediate and direct impacts. At the same time, at the international level, diplomats and trade-negotiators have to marshal scientific understandings in new and unprecedented ways. These are just some of the unique contexts in which science advice plays a role. This session drills deep into the diverse contexts of science advice to better understand its real-world application.

- 4.1: Dealing with disaster – The role of science advice before, after, during
 - 4.2: Smart Cities - Urban and Urbanising
 - 4.3: The local is global – The intersection of science advice and science diplomacy
-



Time	Program
11:30-13:00	<p>Parallel Panel Session One</p> <hr/> <p>Parallel Session 1.1: Human wellbeing in a digital age – Are new measures and considerations needed in the face of pervasive technology? Room 4A</p> <p>This session builds on work undertaken by INGSA for the OECD's Going Digital initiative (http://www.oecd.org/going-digital/). Wellbeing is defined broadly to reflect on the wellbeing of individuals and social groupings within social and civic (liberal democratic) contexts and how this is evolving as a result of digital transformation. Digital transformation includes networking, communications, monitoring, surveillance and predictive technologies. Examples including AI, machine learning and predictive algorithmic applications; the internet of things and the monitoring and measurement that ensues; new media and communication, etc. Panellists will be asked to consider the ways in which the unprecedented speed and pervasiveness of these technologies are affecting human wellbeing in the broadest sense.</p> <p>MODERATOR Kristiann ALLEN, Executive Secretary of INGSA</p> <p>SPEAKERS Toyoaki NISHIDA, Professor, Graduate School of Informatics, Kyoto University Fabrice MURTIN, Head of Section at the Organisation for Economic Co-operation and Development (OECD) in the Households Statistics and Progress Measurement Division Tahu KUKUTAI, Professor, University of Waikato Mylène DESCHÊNES, Director, Ethics and Legal Affairs, Office of the Chief Scientist, Fonds de Recherche du Québec Yuko HARAYAMA, Professor Emeritus, Tohoku University</p> <hr/> <p>Parallel Session 2.1: The role of arts, humanities and the interpretive social sciences in advancing knowledge advice for the SDGs Sokairo Hall</p> <p>It is undeniable that today's global challenges are fundamentally social issues. Achieving the collective consciousness and risk-awareness necessary for the change required will mean profound shifts in individual and population attitudes and behaviours – solutions which are not typically the remit of the natural and physical sciences and technology. How have the arts, humanities and social sciences approached the issues? In what ways are they helping to advance the SDG agenda, both in their own right and in collaboration across disciplines? What can we learn from observing other disciplines and how can lessons be applied collectively? How do the arts, humanities and social sciences engage in advising governments?</p> <p>MODERATOR David Budtz PEDERSEN, Professor of Science Studies, Aalborg University</p> <p>SPEAKERS Sujatha RAMAN, Associate Professor/Reader & Director of Research, Australian National University Christine WEIDENSLAUFER, Attorney at Law/ Legislative Advisor, the Library of Chile's National Congress Matthias KAISER, Director, Centre for the Study of the Sciences and Humanities (SVT), University of Bergen Marc SANER, Full Professor and Chair, University of Ottawa, Department of Geography, Environment and Geomatics</p> <hr/> <p>Parallel Session 3.1: Building trust between evidence brokers and multiple audiences Room 1A&1B</p> <p>Invited panelists in this session have a wealth of experience in providing science advice and analysis of science advisory situations, including the most challenging. Representing esteemed advisory organisations and with plenty of stories and lessons to share, panelists will explore the break-down and rebuilding of trust and why it is essential for any hope of evidence informed policy.</p> <p>MODERATOR Jan Marco MÜLLER, Coordinator for Science to Policy and Science Diplomacy, International Institute for Applied Systems Analysis (IIASA)</p> <p>SPEAKERS Rebekah WIDDOWFIELD, Chief Executive, Royal Society of Edinburgh Motoko KAKUBAYASHI, Press officer at the Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU), The University of Tokyo Roger PIELKE, Professor, Department of Athletics at the Center for Science and Technology Policy Research at the University of Colorado Boulder Tracey BROWN, Director of Sense About Science Janusz BUJNICKI, Professor, Member of the European Commission's Group of Chief Scientific Advisors, International Institute of Molecular and Cell Biology in Warsaw</p>

Time	Program	
	Parallel Session 4.1: Dealing with disaster – The role of science advice before, after, during	Room 4B
	Science advisors and science advisory mechanisms typically do not crossover into the role of decision makers. However in quickly evolving crises, the lines can be blurred. The stages of a crisis require distinct types, timing and packaging of advice, all of which also depend on the issue at hand. Panelists will draw on experience to explore lessons learned in dealing with various types of crisis including its aftermath.	
	MODERATOR Abhi VEERAKUMARASIVAM , Professor/Doctor, Department of Biotechnology, School of Science and Technology, Sunway University	
	SPEAKERS Haruo HAYASHI , President, National Research Institute for Earth Science and Disaster Resilience Tom De GROEVE , Deputy Head of Unit, European Commission, Joint Research Centre Elizabeth Silvestre ESPINOZA , Vicerrector of Research of Universidad Católica Santo Toribio de Mogrovejo Meghnath DHIMAL , Senior Research Officer and Chief, Health Research Section, Nepal Health Research Council (NHRC) Anne BARDSLEY , Associate Director of Research, Centre for Science in Policy, Diplomacy and Society (SciPoDS), University of Auckland	
13:00-14:00	Lunch	
	Clarivate Analytics Luncheon Seminar “Mapping the landscape of research on SDGs” (13:15 – 13:55)	Room 1A&1B
14:00-15:30	Plenary Panel Session II: Socio-techno transformation and the Global Goals	Sokairo Hall
	The Sustainable Development Goals require both technical and social innovation if they are to be realised. From municipalities to multi-laterals, all jurisdictions in all countries have a role to play as these goals are not a traditional “development issue.” The session will explore all types of innovations taking place right now or those that are planned in the near future to help realise the goals. What can we learn from each other? How is the science community engaging?	
	MODERATOR Connie NSHEMERIRWE , Co-Chair, Global Young Academy	
	SPEAKERS Kay FIRTH-BUTTERFIELD , Head of AI and Machine Learning at the World Economic Forum Haruo TAKEDA , Corporate Chief Engineer, Hitachi, Ltd. Xavier ESTICO , Chief Executive Officer, National Institute of Science Technology & Innovation (NISTI) E. William COLGLAZIER , Editor-in-Chief, Science & Diplomacy Michael BARBER , Executive Committee Australian Academy of Sciences	
15:30-16:00	Coffee Break	
16:00-16:30	Keynote Speech II	Sokairo Hall
	Vladimir ŠUCHA , Director-General, European Commission - Joint Research Centre	
16:30-17:00	Wrap-up and Conclusions of the first day	Sokairo Hall
	<ul style="list-style-type: none"> • Rapporteurs <ul style="list-style-type: none"> • Amal Amin Ibrahim SHENDI NADA • Shaheen MOTALA-TIMOL • Bernardo URBANI • Mahesh KUMAR • Marc SANER – Conclusions from Day 1 	
18:00	Conference Reception	
	Belle Salle Roppongi Grand Conference Centre, Roppongi Grand Tower 9F	





DAY TWO WEDNESDAY 7TH NOVEMBER

Time	Program	
08:20-08:30	Opening Session: Re-cap of Day 1 and Plan for Day 2	Sokairo Hall
	James WILSDON , Vice-Chair of INGS / Professor of Research Policy, University of Sheffield	
08:30-09:00	Keynote Speech III	Sokairo Hall
	Dr Rémi QUIRION , Chief Scientist of Québec	
09:00-10:30	Plenary Panel Session III: Science advice at multiple levels – From local to global	Sokairo Hall
	All public policy at all levels should be evidence informed, but especially regarding the SDGs. This is because the SDGs by definition will require a sustainable and coordinated global effort to achieve, but there is rarely easy consensus on the best way forward especially where a perceived solution will have trade-offs and implications. In these circumstances, evidence, honestly brokered, can be an arbiter and help point a direction toward consensus. Can knowledge brokers from multiple levels play a role in developing consensus? Under what conditions does this work or not work? How are power dynamics dealt with across levels and jurisdictions? Can science play a bridging role?	
	MODERATOR Tateo ARIMOTO , Visiting Professor, National Graduate Institute for Policy Studies (GRIPS) / Principal Fellow, Japan Science and Technology Agency (JST) and Vice Director General, International Institute for Advanced Studies	
	SPEAKERS Alex HARRIS , Head of Global Policy, The Wellcome Trust ZAKRI Abdul Hamid , Former Science Advisor to the Prime Minister of Malaysia Michael HALPERN , Deputy Director, Center for Science and Democracy, Union of Concerned Scientists Carla-Leanne WASHBOURNE , Lecturer in Environmental Science and Policy, Department of Science, Technology, Engineering and Public Policy, University College London	
10:30-11:00	Coffee Break	
11:00-12:30	Parallel Panel Session Two	
	Parallel Session 1.2: Technological risk management – Dealing with uncertainties, risks, trade-offs and human values	Room 4A
	Technological change is inherently risky and inherently uncertain. Yet we rely on it to progress societal goals and interests. More often than not, there are trade-offs associated with new technologies. What strategies are there to achieve the greatest benefit from promising technologies while minimising the risks? Are there instances when decision-makers have been too cautious or not cautious enough and what are have been the implications?	
	MODERATOR Clarissa RIOS ROJAS , Founder & Director at Ekpa'palek / Global Young Academy	
	SPEAKERS Hema SRIDHAR , Chief Advisor - C4ISR, Ministry of Defence Atsushi SUNAMI , Vice President, National Graduate Institute for Policy Studies (GRIPS) / Executive Director, The Sasakawa Peace Foundation Pieter van BOHEEMEN , Researcher, Rathenau Instituut Vardit RAVITSKY , Associate Professor, University of Montreal Yasunori KIMURA , Principal Fellow, Center for Research and Development Strategy (CRDS), Japan Science and Technology Agency (JST) / Senior Fellow, Fujitsu Laboratories Ltd.	

Time

Program

Parallel Session 2.2: Mapping critical policy nodes – Identifying the articulation points between interacting SDGs and domestic policy priorities

Sokairo Hall

With 17 Goals and more than 169 targets, how can policy makers begin to address the SDGs in a meaningful way? What's more, taking positive action on one goal could have a detrimental impact on another, but indirectly help progress yet a different goal. This complexity of interactions has long been recognised as a possible complication for policy makers, but it can also be a benefit. The International Council for Science and INGSA are embarking on a project that will not only map the key critical interactions, but also support countries to prioritise them in accordance with national contexts and domestic policy goals. This session will be dedicated to testing ideas about how the goals interact and about how to prioritise. Panelists will draw on their expertise and experience in priority setting in complex policy environments and discuss how scientific and technical knowledge is mobilised in explicating the options and ranking the issues and responses.

MODERATOR

Anne-Sophie STEVANCE, Science Officer, International Science Council (ISC)

SPEAKERS

Satoru OHTAKE, Adjunct Fellow, CRDS, JST/Visiting Professor, Policy Alternative Research Institute, The University of Tokyo

Rémi QUIRION, Chief Scientist of Quebec

Peter GLUCKMAN, Chair of INGSA

Ernesto Fernández POLCUCH, Chief of Section for Science, Policy and Partnerships in UNESCO

Apollonia MIOLA, Project Leader, European Commission - Joint Research Centre

Parallel Session 3.2: Skills Development for Evidence Brokerage

Room 1A&1B

Those engaged in science advising are more than communicators in the traditional sense, they are evidence brokers. This role encompasses a skill set that straddles multiple domains of expertise. What characterises evidence brokers in both the innate and learned components? The European Commission's Joint Research Centre (JRC) has recently led an effort to map the essential skills with a view to building capacities of brokers at the interface of evidence and public policy. Panelists will share their views about essential skills and how to learn/teach them.

MODERATOR

David MAIR, Head of Unit, Joint Research Centre, European Commission

SPEAKERS

Emily HAYTER, Programme Specialist & Acting Head, Evidence for Policy, INASP

Carlos ABELEDO, Professor of Science Policy, University of Buenos Aires

Mitsunobu KANO, Vice Executive Director, Chair of the SDGs Initiative Planning Committee, and Professor, Okayama University

Marga GUAL SOLER, Senior Project Director, AAAS Center for Science Diplomacy

Eeva HELLSTRÖM, Senior Lead, The Finnish Innovation Fund - Sitra

Parallel Session 4.2: Smart Cities - Urban and Urbanising

Room 4B

Increasing urbanisation means that the world's cities are positioned at the heart of the SDGs. The metropolitan/municipal level of government is the closest to the site of action on sustainability and social innovation. It is also the prime testbed for new sustainable technologies and an ideal unit of analysis for exploring social acceptance of these.

Yet large cities especially are also diverse and socially fragmented, sometimes to a greater extent, than at macro scales. In addition, they may not have access to the level and quality of advice as higher-level jurisdictions, which can create tensions. How can cities become leaders for change? What promising practices and projects are already underway and what are the lessons learned? What is the role of science advice?

MODERATOR

Rob MOORE, Executive Director, Gauteng City-Region Observatory, South Africa

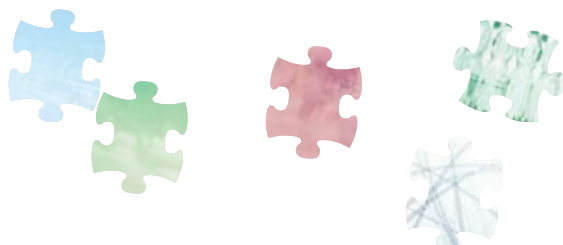
SPEAKERS

Alice SIRAGUSA, Project Officer, Joint Research Centre, European Commission

Takashi OGUCHI, Professor, Institute of Industrial Science, The University of Tokyo

FONG Wee Kean, Deputy China Country Director and Global Lead for Subnational Climate Strategy at World Resources Institute (WRI)

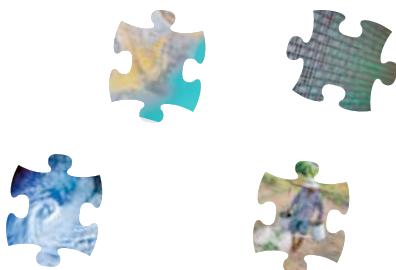
Carla-Leanne WASHBOURNE, Lecturer in Environmental Science and Policy, Department of Science, Technology, Engineering and Public Policy, University College London



Time	Program
12:30-13:30	Lunch
13:30-15:00	<p>Parallel Panel Session Three</p> <p>Parallel Session 1.3: Big data transforming policy-making – What are the opportunities and challenges? Room 4A</p> <p>Big data has been described as a new gold rush. Mining databases with new questions, linking and combining them in novel ways is said to be able to reveal new insights and patterns about the behaviours, health, mobility, and other trends about people and things. How has the introduction of big data capabilities transformed the public service? Do policy makers and decision makers approach policy problems differently with big data insights? Has it changed evaluation and monitoring behaviour? Do policy makers test hypotheses with data? In what other ways are they making use of big data? Is it the expected gold rush? What are the opportunities and barriers to better use of big data in policy making.</p> <p>MODERATOR Anders KARLSSON, Vice President, Global Strategic Networks, Elsevier SPEAKERS André Carlos PONCE DE LEON FERREIRA DE CARVALHO, Professor, Institute of Mathematics and Computer Sciences Pearl DYKSTRA, Full Professor, Erasmus University Rotterdam Jennifer CURTIN, Director, Public Policy Institute, University of Auckland Kristiann ALLEN, Secretary of INGSA</p> <hr/> <p>Parallel Session 2.3: The role of the private sector in advancing the SDGs – Implications for science advice Sokairo Hall</p> <p>Governmental and multilateral organisations often step in to lead when there is a market failure. In the case of the SDGs, such leadership is essential to kick-start the movement and ensure coordinated commitments, but is it a case of true market failure? Traditional firms in every sector are increasingly seeing for themselves that socially inclusive and environmentally sound actions are simply good business, while entrepreneurs are seeing opportunities in following public sentiment toward to SDGs. What opportunities are there for firms to lead? Are partnerships with government sufficient? How to ensure compatibility between the needs of industry and the SDGs? What is missing? What could be improved? What is the role of industry?</p> <p>MODERATOR Aidan GILLIGAN, Founder, CEO at SciCom - Making Sense of Science SPEAKERS Cyrille SCHWOB, Head of Technology, AIRBUS Group Asia Pacific Royston BRAGANZA, CEO, Grameen Capital India Pvt. Ltd Hiroshi UEDA, Director & Senior Managing Executive Officer, Sumitomo Chemical Company, Limited. Kenichiro YAMAGUCHI, Senior Manager, CDP Worldwide-Japan</p> <hr/> <p>Parallel Session 3.3: Structural considerations for science advice in public policy - From embedded to open science Room 1A&1B</p> <p>Is science advising becoming an institutionalised role? Is it a profession? Must there be a recognised advisory mechanism or is an ad-hoc-as-needed approach sufficient and cost effective? What are the explicit and implicit elements of science advisory structures within governments and how can these best operate in a cohesive way? Panelists will draw on their experience working in and analysing diverse systems.</p> <p>MODERATOR Anna-Maria ARABIA, Chief Executive, Australian Academy of Science SPEAKERS Mark FERGUSON, Director General, Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland Johannes KLUMPERS, Head of Unit "Scientific Advice Mechanism", European Commission Claire CRAIG, Chief Science Policy Officer, The Royal Society Gavin COSTIGAN, Director of Public Policy, University of Southampton Doyin ODUBANJO, Executive Secretary, The Nigerian Academy of Science</p>



Time	Program	
	Parallel Session 4.3: The local is global – The intersection of science advice and science diplomacy	Room 4B
	<p>This session draws on the knowledge of some of the most experienced and respected science diplomats. They will address a variety of issues in this growing discipline, from the basics of what is science diplomacy and how/when is it deployed to how the practice has changed over the years. What are the points of convergence and the tensions between the distinct disciplines of science and diplomacy that practitioners must consider? How does science diplomacy operate across jurisdictions and levels of governance to help progress the SDGs?</p>	
	<p>MODERATOR Marcelo Garcia SILVA, Adviser, Directorate of Energy, Science & Technology and Innovation (DECYTI) (Ministry of Foreign Relations of Chile)</p> <p>SPEAKERS Dalia KREIVIENÉ, Deputy Director, External Economic Relations and Economic Security Policy Department, Lithuanian Ministry of Foreign Affairs (MFA)</p> <p>Franklin CARRERO-MARTINEZ, Director of Science and Technology for Sustainability Program at the US National Academy of Science, Engineering and Medicine</p> <p>Paul BERKMAN, Director, Science Diplomacy Center, Fletcher School of Law and Diplomacy / Tufts University</p> <p>Teruo KISHI, Science and Technology Advisor to the Minister for Foreign Affairs of Japan</p> <p>Yousuf AL-BULUSHI, Director of Transfer of Science, Knowledge and Technology Office at the Oman Ministry of Foreign Affairs</p>	
15:00-15:30	Coffee Break	
15:30-16:00	Keynote Speech IV	Sokairo Hall
	Hon. Minister Eugene Mutimura , Minister of Education, Government of Rwanda	
16:00-17:30	Plenary Session IV: Conclusions and The Way Forward	Sokairo Hall
	<p>The last plenary of the conference summarises what we have achieved in the meeting, lessons shared and the outlook for the future, including some promising new projects and the INGSA 2020 conference location.</p>	
	<p>MODERATOR Sir Peter GLUCKMAN</p>	
	<p>Conclusions</p> <ul style="list-style-type: none"> • GYA/YAJ/SCJ Workshop: Connie NSHEMERIRWE (GYA) and Akihiro KISHIMURA (YAJ) • Rapporteurs <ul style="list-style-type: none"> • Clarissa Rios ROJAS • Richard GLOVER • Ana-Maria ILIEV • Mirabbos HOJAMBERDIEV • Oscar REYES • Farah Atiqah Awang ISMAIL • Alessandro ALLEGRA • George ASIAMAHA 	
	<p>The Way Forward</p> <ul style="list-style-type: none"> • What are the next steps for science advice globally? • Building momentum <ul style="list-style-type: none"> • INGSA Research and Project Plans • SIRD / FMSTAN / CSAN • Announcing INGSA 2020 • Closing Address – Sir Peter GLUCKMAN • SDGs Interactions Project • International Science Council • Final Remarks – Teruo KISHI 	
17:30	Closing of the Conference	



SATELLITE EVENTS

5th November 2018

GYA/YAJ/SCJ Capacity Building Workshop

Invitation-only workshop on Science Leadership and Science Advice, developed by the Global Young Academy (GYA) and the Young Academy of Japan (YAJ)

Time 10:00 – 17:00 [?](#) **Venue** Room at Science Council of Japan

Science Diplomacy Workshop - In collaboration with FMSTAN

Invitation-only workshop on the topic of Science Diplomacy, utilising the expertise of members of FMSTAN

Time 13:00 – 17:00 [?](#) **Venue** Room 1A&1B, GRIPS

Sense About Science / Elsevier - Public Guide to Data Science

Invitation-only workshop with Sense About Science and Elsevier on Data Science

Time 10:00 – 12:30 [?](#) **Venue** Conference Room No 5, Roppongi Academy Hills, Mori Tower 49F

Getting there <http://forum.academyhills.com/roppongi/en/access/> [?](#) **Map** <http://bit.ly/MoriTower>

GRIPS Forum

Open public forum featuring lecture from Kay Firth-Butterfield (World Economic Forum)

Time 16:40 – 18:10 [?](#) **Venue** Sokairo Hall, GRIPS

8th November 2018

Science in the Global South – LMIC Breakfast – Hosted by IDRC

Invitation-only breakfast to discuss Science in the Global South

Time 8:00 – 10:30 [?](#) **Venue** Lounge, GRIPS

Cities and Urban Science Advice Workshop

Invitation-only workshop on Urban Science Advice Urban Science Advice Workshop– Integrating the local, regional and global contexts for science advice in cities

Time 10:00 – 12:30 [?](#) **Venue** Room 4A, GRIPS

Parliamentary Advice Workshop

Invitation-only workshop on Parliamentary Science Advice Workshop

Time 9:00 – 16:30 [?](#) **Venue** Room 1A&1B, GRIPS



Carlos ABELEDO

Professor of Science Policy, University of Buenos Aires

Carlos Abeledo is currently Professor of Science Policy at the Graduate Program in Science and Technology Policy of the University of Buenos Aires. He obtained an undergraduate degree in Physical Chemistry at the University of Buenos Aires in 1957 and a PhD 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 Argentine National Council of Scientific and Technological Research. From 1991 to 1997 he was a science and technology specialist at the Inter-American Development Bank, involved in the design and evaluation of programs to support institutional science development programs in several Latin American countries

Carlos Abeledo has been a consultant to several Latin American countries as well as institutions such as UNDP, IDRC, European Commission and Inter-American Development Bank in science policy, governance and evaluation of S&T institutions. 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)".

Carlos Abeledo is currently Chair of the Steering Committee of INGSA's Latin America Chapter.



Kristiann ALLEN

Executive Secretary, INGSA/Science Policy Specialist, Office of the Chief Science Advisor, Canada

Kristiann Allen is a senior policy practitioner with specialisation in evidence-to-policy processes and senior advisor experience in multiple policy contexts internationally, including provincial, federal and multi-lateral systems. Most recently, she has served as Chief of Staff to the Prime Minister's Chief Science Advisor, NZ. Prior to this, Kristiann worked within the science policy system in her native Canada. During 2018-19 Kristiann returns to the Canadian science advisory system through professional interchange with the Canadian Chief Science Advisors' office and the Canadian Institutes for Health Research. Kristiann is a founding member of INGSA, serving as executive secretary and providing strategic direction, developing training material and undertaking mentorship.



Anna-Maria ARABIA

Chief Executive, Australian Academy of Science

Prior to her appointment as Chief Executive of the Australian Academy of Science, Anna-Maria was Principal Adviser to the Hon Bill Shorten.

Anna-Maria brings with her experience as General Manager of Questacon - the National Science and Technology Centre; and CEO of Science & Technology Australia.

Anna-Maria has worked in senior policy roles in both social and economic portfolios. She has worked extensively with parliamentarians, the business and community sectors, and the media.

Anna-Maria was recently a Director of the Board of Spinal Cord Injuries Australia, an organisation committed to creating independence, dignity and unlimited opportunity for people living with spinal cord injury.

She is a passionate advocate for science, social justice and gender equity.

Anna-Maria obtained her Bachelor of Science (Hons) from the University of Melbourne and has undertaken medical research in the field of neuroscience both in Australia and abroad.



Tateo ARIMOTO

Professor, Innovation, Science and Technology Program, National Graduate Institute for Policy Studies/Principal Fellow, Japan Science and Technology Agency/ Vice Director General, International Institute for Advanced Studies

Visiting Professor, National Graduate Institute for Policy Studies (GRIPS); Principal Fellow, Japan Science and Technology Agency (JST) and Vice Director General, International Institute for Advanced Studies

Tateo Arimoto is a Professor and Deputy Director, Science, Technology and Innovation Policy Research Center at the National Graduate Institute for Policy Studies (GRIPS). He served as Director General of Science & Technology Policy Bureau of the Ministry of Education and Science and held the position of Executive Research Fellow at the Economic and Social Research Institute of the Cabinet office. He has played an active role in public policy making and implementation in the area of science, technology and innovation in Japan and is a major promoter of science of STI policy with multidisciplinary approach. He has been a co-chair person of the OECD study projects on scientific advice and research funding system. He is a member of the program committee of the International Network for Government Science Advice (INGSA), and the special committee of Science Diplomacy at the Ministry of Foreign Affairs of Japan. He has published several books and numerous papers and given many invited lectures at international conferences such as OECD, INGSA, APEC, EU, WSF, STS Forum and AAAS; "Rebuilding Public Trust in Science for Policy Making" (by T. Arimoto and Y. Sato, Science, vol.337, pp1176-1177, 2012); "Building the Foundations for Scientific Advice in the International Context" (by T. Arimoto et al., Science and Diplomacy, vol.3 No.3, September 2014); "UNESCO Science Report – Towards 2030", Japan Chapter" (by Y. Sato, and T. Arimoto, November 2015); "Five years after Fukushima: scientific advice in Japan" (by Y. Sato and T. Arimoto, Palgrave Communications, 2016); "Science in a changing world" (by T. Arimoto, Physics World, Institute of Physics, UK, 2018)



Michael BARBER

Executive Committee Australian Academy of Sciences

Professor Barber is internationally known for his substantial contributions to the mathematical development of statistical mechanics. With M.E. Fisher he developed the scaling theory of systems of finite size, together with the related theory of remnant functions. His articles and reviews are widely consulted, being the leading exposition of these subjects. He pioneered the application of optimal control theory to the renormalisation group, revealing the limitations of Kadanoff's variational approach. His renormalisation group technique for analysing Monte Carlo data is widely used. He has also made significant contributions to two-dimensional lattice models, and to improved techniques for extrapolating sequences.



Anne BARDSLEY

Associate Director of Research, Centre for Science in Policy, Diplomacy and Society (SciPoDS), University of Auckland

Anne's background is in biomedical science and biotechnology. Her current research interests revolve around the use of evidence in policymaking, concepts of risk and precaution in relation to emerging technologies, and the changing nature of interactions between science and societal decision-making.

Anne has considerable expertise in synthesizing and communicating scientific evidence to inform the public and policy-makers on a broad range of topical issues. Working with Sir Peter Gluckman in his former role as the Prime Minister's Chief Science Advisor, she led a number of high-impact projects involving close collaboration with leading scientific and policy experts both within New Zealand and internationally.

She has also served as Commissioning Editor for a number of international peer-reviewed scientific journals spanning multiple disciplines. In this role, she helped identify emerging lines of scientific enquiry and facilitated the quality assurance of publications through robust peer review.

Anne holds a PhD in Molecular Biology from the University of Colorado at Boulder, USA, and was a Research Fellow at Lund University in Sweden, and at the University of Auckland.



Paul Arthur BERKMAN

Director, Science Diplomacy Center Fletcher School of Law and Diplomacy, Tufts University

Professor Paul Arthur Berkman is building connections between science, diplomacy and information technologies to promote cooperation and prevent conflict, balancing national interests and common interests for the benefit of all on Earth across generations. He became a Visiting Professor at the University of California Los Angeles at the age of 23, after wintering the previous year in Antarctica on a SCUBA research expedition with Scripps Institution of Oceanography, leading him to all seven continents before the age of thirty. During the intervening years, Paul received his masters and doctorate as a National Science Foundation graduate fellow at the Graduate School of Oceanography, University of Rhode Island. A decade later, he wrote the textbook on Science Into Policy. As a Fulbright Distinguished Scholar, he chaired the Antarctic Treaty Summit at the Smithsonian Institution in 2009, resulting in the first book on Science Diplomacy. Applying lessons of science diplomacy the following year, as Head of the Arctic Ocean Geopolitics Programme at the University of Cambridge, he co-directed the first formal NATO-Russia dialogue regarding Environmental Security in the Arctic Ocean. He also co-convened the 1st and 2nd International Dialogue on Science and Technology Advice in Foreign Ministries in 2016 and 2017. He currently coordinates the Arctic Options and Pan-Arctic Options projects (involving national science agencies in the United States, Russian Federation, Norway, France, China and Canada from 2013-2020). Prof. Berkman joined the Fletcher School of Law and Diplomacy in 2015 as Professor of Practice in Science Diplomacy and now is Director of the Science Diplomacy Center at Tufts University. For his international, interdisciplinary and inclusive (holistic) contributions to informed decision-making at global-local levels, Prof. Berkman has received awards around the world, including a Japan Society for the Promotion of Science fellowship in 1993. Paul is happily married with two daughters.



Pieter Van BOHEEMEN

Researcher, Rathenau Instituut

Pieter van Boheemen is fascinated by the societal impact of science and technology. In recent work he investigated social and ethical aspects of synthetic biology, open science, blockchain, cyber security and digitalisation of the news. With the aim to inform and involve parliament, policy makers and a wider range of stakeholders, he frequently applies participatory research methods such as co-creation and design thinking. He is a member of the Human Practices Executive Committee of the biotech competition iGEM and the advisory committee of the Creative Industries Fund NL.

Pieter obtained a master's degree in Life Science & Technology at the TU Delft and Leiden University. During his studies he started two companies: one in software and another in e-commerce. After this he worked at Accenture and co-founded biotech startup Amplino. He then turned to social innovation, covering citizen involvement in smart cities and biotech. As manager at Waag Society he led the teams of the Open Wetlab, Open Design Lab and FabLab Amsterdam, which facilitate critical making practices that intersect art, science and technology. The teams created open, fair and inclusive technology in several European FP7, H2020 and Creative Europe projects. The outcomes have been featured in international art, design and science museums and festivals.



Royston BRAGANZA

CEO, Grameen Capital India Pvt. Ltd.

Royston joined Grameen Capital in 2007 to launch the organization as CEO. Grameen Capital, founded by Grameen Foundation USA, IFMR Trust and Citigroup, is a first of its kind social business enabling Microfinance Institutions and Social Enterprises wider access to the capital markets. It is part of the global Grameen family of companies, the flagship being the Nobel Prize-winning Grameen Bank founded by Nobel Laureate Professor Muhammad Yunus. To realise his dream of a "Capital-with-a-Conscience" ecosystem, Grameen Capital recently promoted "Grameen Impact Investments India" a unique vehicle to provide debt financing to social enterprises across sectors such as Affordable Education and Skill Development, Affordable Healthcare, Clean energy & Innovation, Agriculture, Financial Inclusion and Livelihoods. In addition to being the Chair of Sa-Dhan, whose members have over 30 million women micro-entrepreneurs, he serves on many boards and advisory bodies, including Grameen Foundation India, Inclusive Business Action Network (iBAN), FICCI Financial Inclusion Committee, CII National Committee on NBFCs, the United Nations Microfinance Resource Group, Impact Investors Council, Inclusive Business Action Network and Banking & Finance Committee of the Indian Merchant Chambers. He has been invited to address various programs in India and globally, to promote impact investment and blended finance as a sustainable tool to eradicate poverty, and to achieve the Sustainable Development Goals. In September 2018, Royston addressed a high-level side at the 73rd session of the UN General assembly in New York on the SDG's. The London-based Finance Monthly publication named Royston in their 2013 Global CEO Award Winners list as Top 4 CEOs in Asia, and Top 2 in India, the other one being Kumar Mangalam Birla. He has also been awarded the Global CSR Leadership award by World CSR Congress and the Power of One Award by the Archdiocese of Bombay.



Tracy BROWN

Director of Sense About Science

Tracy Brown has been the director of Sense about Science since 2002. Under her leadership, the charity has turned the case for sound science and evidence into popular campaigns to urge scientific thinking among the public and among the organisations that serve the public. It has launched important initiatives including AllTrials, a global campaign for the reporting of all clinical trial outcomes; and the Ask for Evidence campaign, which engages the public in requesting evidence for claims. In 2010, the Times named Tracey as one of the ten most influential figures in science policy in Britain and in 2014 she was recognised by the Science Council for her work on evidence-based policymaking. In June 2017 Tracey was made an OBE for services to science.



Janusz Marek BUJNICKI

Professor, International Institute of Molecular and Cell Biology in Warsaw/Member of the European Commission's Group of Chief Scientific Advisors,

Janusz Marek Bujnicki is Professor of Biology, and head of a research group in the International Institute of Molecular and Cell Biology in Warsaw, Poland. Born in 1975, he graduated from the Faculty of Biology, University of Warsaw in 1998, defended his Ph.D. in 2001, and obtained the full professor title in 2009. In 2016 he has been elected to the Polish Academy of Sciences. Bujnicki's research combines bioinformatics, structural biology, and synthetic biology. His scientific achievements include the development of methods for computational modeling of protein and RNA 3D structures, discovery and characterization of enzymes involved in RNA metabolism, and engineering of proteins with new functions. He is an author of > 300 publications, which have been cited by other researchers >8000 times. Bujnicki is an executive editor of the scientific journal Nucleic Acids Research. He has also been involved in various scientific organizations and bodies active in the area of science and policy, including the civic movement Citizens of Science, Scientific Policy Committee - an advisory body of the Ministry of Science and Higher Education in Poland, and the Group of Chief Scientific Advisors within the European Commission's Scientific Advice Mechanism.



Yousuf AL BULUSHI

Head of Science, Knowledge and Technology Transfer Office (SKTT), Ministry of Foreign Affairs, Oman

Yousuf joined the Ministry of Foreign Affairs (MOFA) in May 2015 to lead Oman's Science and Technology Diplomacy, and helps to contribute in developing Oman's transformation process towards innovation-based economy, as well as shaping the national innovation ecosystem through international transfer of advanced science and future technology. Prior to joining MOFA, he was serving as an International Innovation Advisor at the University of Oxford – Oxford University Innovation – since September 2012.

(SKTT) was established in April 2015 at MOFA. The office aims to facilitate access to international technology, and improving the abilities of national institutions and individuals to identify, acquire, adapt and exploit knowledge and technology. SKTT leads the national policies that support improving Oman's absorptive capacities and stimulate its innovation system as well as developing a supportive environment for technology transfer through international cooperation. As a Head of the office, his responsibilities include defining SKTT's strategy, managing science and technology projects, chairing the National Science Advisory Board (soon, Oman Science Academy) as well as leading MOFA's sectorial technical teams.



Kay FIRTH-BUTTERFIELD

Head of AI and Machine Learning at the World Economic Forum

Currently, Global Head of AI and Machine Learning at the World Economic Forum. Barrister-at-Law and former Part-Time Judge, United Kingdom. In the US, has been a Professor of Law and International Relations. Associate Fellow, Centre for the Future of Intelligence, University of Cambridge; Fellow, Robert E. Strauss Center on International Security and Law, University of Texas. Vice-Chair, IEEE Initiative on Ethics of Autonomous and Intelligent Systems. Co-founded AI-Austin, AI-Global and the Consortium for Law and Policy of Artificial Intelligence and Robotics. Named one of the top 25 Women in Robotics, Robohub (2017) and one of 12 Brilliant women in AI and Ethics (2018)



Andre Carlos Ponce de Leon Ferreira de CARVALHO

Professor, Institute of Mathematics and Computer Sciences, University of São Paulo

André C. P. L. F. de Carvalho is Full Professor in the department of Computer Sciences, University of São Paulo, Brazil. He was Associate Professor in the University of Guelph, Canada. He was visiting researcher in the University of Porto, Portugal and visiting professor in the University of Kent, UK. His main interest areas are Data Science, Data Mining and Machine Learning. He was the founding director of the Center of Data Science, University of São Paulo. He is currently the Deputy Dean of the Institute of Mathematics and Computer Sciences, University of São Paulo. He is a member of the Scientific Committee of the Applied Mathematics School, Fundação Getúlio Vargas (FGV), of the Advisory Committee in Computer Science of the Brazilian National Council for Scientific and Technological Development (CNPq), of the Steering Committee of the International Network for Government Science Advice (INGSA) Latin American and Caribbean Chapter and of the Brazilian network Science for Education (CpE).



Helen CLARK

Former Administrator of UNDP, Former Prime Minister of New Zealand

Helen Clark was Prime Minister of New Zealand for three successive terms from 1999–2008. She was the first woman to be elected as Prime Minister in New Zealand.

Throughout her tenure as Prime Minister, and as a Member of Parliament over 27 years, Helen Clark engaged widely in policy development and advocacy across the international, economic, social, environmental, and cultural spheres. She advocated strongly for New Zealand's comprehensive program on sustainability and for tackling the problems of climate change. She was an active leader of her country's foreign relations, engaging in a wide range of international issues.

In April 2009, Helen Clark became Administrator of the United Nations Development Programme. She was the first woman to lead the organisation, and served two terms there. At the same time, she was Chair of the United Nations Development Group, a committee consisting of all UN funds, programs, agencies, and departments working on development issues. As Administrator, she led UNDP to be ranked the most transparent global development organisation. She completed her tenure in 2017.

Helen Clark came to the role of Prime Minister after an extensive parliamentary and ministerial career. Prior to entering the New Zealand Parliament, Helen Clark taught in the Political Studies Department of the University of Auckland, from which she earlier graduated with her BA and MA (Hons) degrees.

Helen continues to be a strong voice for sustainable development, climate action, gender equality and women's leadership, peace and justice, and action on non-communicable diseases and on HIV.



E. William COLGLAZIER

Editor-in-Chief, Science & Diplomacy

Dr. E. William Colglazier is Editor-in-Chief of Science & Diplomacy and Senior Scholar in the Center for Science Diplomacy at the American Association for Advancement of Science (AAAS). He works there to advance knowledge and practice on science policy and science diplomacy and to support international collaboration and cooperation in science and technology. He served as the fourth Science and Technology Adviser to the Secretary of State from 2011 to 2014. In this non-political position of fixed term, his role was to provide scientific and technical expertise and advice in support of the development and implementation of U.S. foreign policy. From 1994 to 2011, he served as Executive Officer of the U.S. National Academy of Sciences and National Research Council where he helped to oversee the studies that provide independent, objective scientific advice on public policy issues. From January 2016 to January 2018 he co-chaired the 10-Member Group appointed by the United Nations Secretary General to advise on science, technology, and innovation for achieving the 17 Sustainable Development Goals of the 2030 Agenda. He received his Ph.D. in theoretical physics from the California Institute of Technology in 1971, and prior to 1994 worked at the Stanford Linear Accelerator Center, the Institute for Advanced Study in Princeton, the Center for Science and International Affairs at Harvard's Kennedy School of Government, and the University of Tennessee. In 2015 he received the Joseph A. Burton Forum Award of the American Physical Society to recognize "outstanding contributions to the public understanding or resolution of issues involving the interface of physics and society" and the Order of the Rising Sun, Gold Rays with Neck Ribbon, from the Japanese government for "contributing to science and technology exchange and mutual understanding between Japan and the United States."



Gavin COSTIGAN

Director of Public Policy, University of Southampton

Gavin Costigan became the Director of Public Policy at the University of Southampton in March 2016. His work involves brokering relationships between researchers and policy makers, delivering training to academics on how to interact with policymakers, and increasing the policy impact of research at the University. In September 2018, he also became the inaugural chair of the UK's Universities Policy Engagement Network (UPEN), a grouping of around 20 UK universities seeking to increase policy impact from research. Before his current role, he spent six years as the Director of the Vice-Chancellor's Office at the University of Southampton. Prior to this, he was a civil servant in central government in the UK for just under 17 years, in what is now the Department for Business, Enterprise & Industrial Strategy, as well as in the Foreign & Commonwealth Office. His roles included leading the network of science attachés in UK embassies, managing the Large Facilities Capital Fund within the Science Budget, and reviewing the governance of Research Council Institutes.



Claire CRAIG

Chief Science Policy Officer, The Royal Society

Dr Claire Craig CBE is Chief Science Policy Officer at the Royal Society. The Royal Society is the independent scientific academy of the UK and the Commonwealth, dedicated to promoting excellence in science, and is a self-governing Fellowship of many of the world's most distinguished researchers drawn from all areas of science, engineering and medicine. Previously Claire was the Director of the UK Government Office for Science which supports the UK Government's Chief Scientific Adviser (GCSA). The GCSA provides science advice to the Prime Minister and the Cabinet; and builds capacity across government to provide and use science evidence. Claire has worked extensively on strategy and science in decision-making. Her career includes periods at McKinsey & Co and the Prime Minister's Delivery Unit, working in the Cabinet Office and the Ministry of Defence. She was awarded a CBE for her part in developing the UK government's science-based strategic futures programme, Foresight, which provided evidence and insights to decision-makers in areas from flood risk in 2080 to human enhancement and the future of computer-based trading in financial markets. Claire has held Board-level roles at a range of research and teaching institutions including the Council of King's College London; the University of the West of England; and Newnham College, Cambridge. She is also the UK representative on the Governing Body of the EU's Joint Research Centre. Over nearly two decades in government Claire worked in a wide range of policy areas and with three UK Government Chief Scientific Advisors. Her first book "How does government listen to scientists?" was published by Palgrave in August 2018. She trained originally as a geophysicist, and spent two years helping launch a hands-on science centre in her home town of Bristol.



Jennifer CURTIN

Director, Public Policy Institute, University of Auckland

Professor Jennifer Curtin is Director of the Public Policy Institute at the University of Auckland, New Zealand. She is currently engaged in funded comparative research projects focused on developing sustainable strategies for gender budgeting and wellbeing, the policy impact of women political leaders at the subnational level, and surveying citizens views on complex policy problems. She is the academic director of Auckland's Master of Public Policy Programme and teaches comparative public policy and political science. Jennifer has published widely on politics and public policy in New Zealand and Australia, and regularly engages with government, civil society and the media.



Mylène DESCHÊNES

Director, Ethics and Legal Affairs, Office of the Chief Scientist, Fonds de Recherche du Québec

Me Deschênes is a lawyer and the director of ethics and legal affairs at the Fonds de recherche du Québec (Canada). She counsels the Chief Scientist of the province of Quebec and the three Quebec funding agencies on questions related to research ethics, ethics research programs and legal issues related to science and policy. She led the draft of the Quebec's Policy on Responsible Conduct of Research and is currently working on ELSI issues related to artificial intelligence research.

Previously, she was the Executive Director of the P3G Consortium, an international, nonprofit organization aimed at facilitating the emergence, harmonization and collaboration between population-based genomics biobanks projects. She also served as Senior Ethics Policy Advisor at the Ethics Office of the Canadian Institutes of Health Research.

She holds law degrees (in common law and civil law) from McGill University and completed a Master degree at University of Montreal in «Law, Biotechnologies and Society» on the commercialisation of genetic testing. Over the years, she served on various ethics committees, including the National Research Council (Canada), and the Montreal Heart Institute.



Meghnath DHIMAL

Senior Research Officer and Chief, Health Research Section, Nepal Health Research Council (NHRC)

Dr. Meghnath Dhimal works as a Chief Research Officer at the Nepal Health Research Council (NHRC), Government of Nepal. In his current role as a Chief Research Officer at NHRC, he contributes to research, academics, policy making and capacity building in research process. Currently, he has been leading a number of national level research projects on climate change and health, tropical diseases, SDGs and NCDs in Nepal such as implementation research on NCDs, prevalence survey of major NCDs, national mental health survey and NCD risk factors STEPS surveys. He completed his MSc in Environmental Sciences from Tribhuvan University in 2004 and PhD in Geo-sciences (Environmental Health Sciences) from the Goethe University in 2015. His career objective is to contribute towards global health. His research's primary focus is on the nexus between environmental risk factors including climate change and associated health outcomes (NCDs and NTDs). He has worked as team leader and coordinator in disaster situation including in floods and mega-earthquake of 2015 in Nepal. He has made substantial contributions to developing national health policies, plans, strategies including environmental health and climate change programmes and policies. He has also served the World Health Organization (WHO) in the capacity of Temporary Adviser as well as in the capacity of Climate Change and Health Expert and has been worked in Nepal, Maldives and Timor-Leste. Recognizing his contribution in the field of climate change and health, he was awarded with the "Young Scientists Award of the Year 2015" by the Nepal Academy of Science and Technology in 2015. Based on his proven scientific excellency and contribution to the society, he has been nominated as a member of Global Young Academy since 2017 for five years. He has authored more than 80 peer-reviewed journal papers, essays, technical reports and articles in the popular press.



Madiagne DIALLO

General Secretary, the Economic, Social and Environmental Council of Senegal.

Prof. Dr. Madiagne Diallo Specialist of Optimization, Operational Research and Decision Science, is professor of the Department of Industrial Engineering of the Pontifical Catholic University of Rio de Janeiro (PUC-Rio) in Brazil. Currently, he is the General Secretary of the Economic, Social and Environmental Council of Senegal. He is former General Consul of Senegal in Sao Paulo, Brazil and former South to South Cooperation Minister Counsellor at the Office of the Republic President of Senegal.

He is author and co-author of 3 books and more than 50 international journal papers. He received Honorary Citizenship of the State of Rio de Janeiro of Brazil after supervising the Rio city Director Plan revision in 2010 for the 2014 FIFA World Cup and 2016 World Olympic Games. He was distinguished in 2010 Academic Achievement Award by the revue Who'sWho in the World. of USA.



Pearl DYKSTRA

Full Professor, Erasmus University, Rotterdam

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 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 (KNAW, 2004) and served as Vice-President of the KNAW (2011-2016). She is also an elected Member of the Dutch Social Sciences Council (SWR, 2006), and elected fellow of the Gerontological Society of America (2010). She received an ERC Advanced Investigator Grant in 2012 for the research project "Families in context", which focuses on the ways in which policy, economic, and cultural contexts structure interdependence in families. In 2015 she was appointed as member of the High Level Group of scientists who advise the College of European Commissioners.



Elizabeth Silvestre ESPINOZA

Vicerector of Research of Universidad Católica Santo Toribio de Mogrovejo

Ph.D in Meteorology, in Numerical Weather Prediction applied in risk management, currently is Vice rector of Research at Universidad Católica Santo Toribio de Mogrovejo - USAT, was Professor at the national Universities of Peru since 2006 have experience in science and technology at CONCYTEC (Consejo Nacional de Ciencia, Tecnología e Innovación) like a Responsible, Sub director and Director in National Programs and Politics and Programs Direction. Was President of INCLIMA and implemented an Early Warning System for Frosts in Andean Region in Peru. As Scientific Director at National Meteorological and Hydrological Service in Peru developed multidisciplinary projects in climate change and impacts. Was Scientific Coordinator of the international project: Low-latitude Ionospheric Sensor Network (LISN), implemented a networking in South America Jicamarca, in Brazil was a Researcher at Universidad do Vale do Paraíba, coordinating high atmospheric research and in CPTEC Researcher and lead of the Data Assimilation Group for Numerical Weather Prediction. Was Visitor scientist, Global Modelling Assimilation Office to assimilate radiances in numerical weather prediction. Advised many national projects on climate change and disasters in the Environment Ministry; experience in integrating projects of institutional content, science and policy.



Xavier ESTICO

Chief Executive Officer, National Institute of Science Technology and Innovation, Seychelles

Mr. Xavier Estico has been appointed as the Chief Executive Officer of the National Institute of Science Technology and Innovation (NISTI) since 2014. His previous positions have been in different management positions in parastatal organizations, including Air Seychelles. His last position was International Administrative Flight Operations Manager.

His academic background extends from Pedagogy, Agronomical Sciences, Business Administration and Aeronautical Sciences. He is a Masters degree holder in all three disciplines, except for Pedagogy, in which he holds a Certificate in Education. He attended; the Seychelles Teacher Training College, Institute of Higher Agricultural Sciences, Havana, Cuba, University of Southampton, UK, and Embry-Riddle Aeronautical University-Worldwide, USA, where he has recently completed his studies in Aeronautical Sciences at Embry-Riddle Aeronautical University-Worldwide, USA. He wrote his Capstone in "The Impact of NextGen Capabilities and Technologies on Tampa International Airport", Florida, USA, one of the first baseline impact assessments of the Next Generation Technologies and Capabilities on US airspace management.

As the CEO of NISTI, he provides overall policy and strategic leadership for Seychelles transition from an efficiency-driven economy to an innovation-driven knowledge-based economy through the National STI Policy and Strategy 2016 - 2025 framework. This framework is designed for the inclusion and integration of STI across all sectors and programs for the socio-economic transformation of Seychelles as a Small Island Developing State.

He sits on the High Level Steering Committee for Knowledge-based Economy, a forum chaired by the Vice-President of the Republic of Seychelles. This committee oversees the progress of the country's transition to a knowledge-based economy. He sat on the Board of Directors of the National Bureau of Statistics and has been lately appointed on the Board of Directors of the Seychelles Bureau of Standards. He is also a member of the National Commission for UNESCO.



Mark FERGUSON

Chief Scientific Adviser to the Government of Ireland

Professor Mark W.J. Ferguson commenced as Director General of Science Foundation Ireland in January 2012 and as Chief Scientific Adviser to the Government of Ireland in October 2012. Professor Ferguson is a founding member of the Small Advanced Economies Initiative, was Chair of the eHealth Ireland Committee, (2015 – 2017), a member of the EU High Level Expert Group on Horizon 2020 Impact (2017) and has been involved in a number of international reviews of R&D systems, including Hungary and Canada. 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).

He is the recipient of numerous international research awards including the 2002 European Science Prize (jointly), and is the author of 327 research papers and book chapters, 60 patent families and author / editor of 8 books.

Mark graduated from the Queens University of Belfast with degrees in Dentistry (BDS 1st class honours), Anatomy and Embryology (BSc 1st class honours, PhD) and Medical Sciences (DMedSc), 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 for services to Health and Life Sciences.

<http://www.sfi.ie/about/organisation/sfi-directors/prof-mark-ferguson.html>



Wee Kean FONG

Deputy China Country Director and Global Lead for Subnational Climate Strategy, World Resources Institute (WRI).

Dr. Wee Kean Fong is the Deputy China Country Director and Global Lead for Subnational Climate Strategy at World Resources Institute (WRI). WRI China currently has four major programs – climate change, energy, sustainable cities, and water. As the deputy country director, Dr. Fong plays an important role in strategic planning, fundraising, and communications for these programs while overseeing WRI China's operations. Dr. Fong is also serving as acting director for WRI China Climate Program. He and his team offer support to provinces and cities on emission peaking roadmap analyses, city climate action planning, and greenhouse gas data analysis and tracking. He and his team currently work with more than a dozen of cities and provinces on subnational low carbon transition.

Under his global portfolio, Dr. Fong leads a global initiative on subnational low carbon transition. The initiative focuses on supporting cities and regions to measure greenhouse gas emissions, set emissions reduction targets, and plan and implement actions. The initiative also facilitates integration of subnational and national climate actions.

Among his recent publications are the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) that provides a standardized framework to enable cities to measure, report, and track greenhouse gas emissions consistently and comprehensively. In 2015, he partnered with UN-HABITAT to develop the Guiding Principles for City Climate Action Planning to guide cities develop and implement credible climate action plans.

Dr. Fong has vast experience around the world. Over the last 20 years, he has been involved in numerous projects in many developing countries, including Brazil, China, Ethiopia, India, Malaysia, Mexico, and others.



Aidan GILLIGAN

CEO, SciCom

Aidan Gilligan is Founder and CEO of SciCom, an international consulting practice delivering solutions to communicating challenging science. SciCom serves as an educator, leader, spokesperson and hub for like-minded professional groups. He has over 15 years' top-tier experience in communicating international science. His drive is advancing understanding for science around the world. His speciality is spearheading comprehensive campaigns that accentuate facts above perceptions about often difficult to communicate issues. Aidan has project-managed over one hundred press and tailored stakeholder events, plus numerous scientific symposia at the nexus of science and society. In so doing, he works closely with policy-maker teams up to Chief Science Adviser and Ministerial level, while forging strong ties with representatives of global media associations and membership organisations. He is Adviser to governments including Japan & South Africa and is a founder of Science Forum South Africa and the Latin American & Caribbean Open Science Forum.



Peter GLUCKMAN

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

Sir Peter Gluckman ONZ FRS is the founding chair of the International Network of Government Science Advice (INGSA) and was the first Chief Science Advisor to the Prime Minister of New Zealand, having been appointed in 2009. He was formerly Science Envoy, Chair of the APEC Chief Science Advisors and Equivalents group and coordinator of the secretariat for the Small Advanced Economies Initiative.

Peter has written and spoken extensively on science-policy and science-diplomacy and science-society interactions.

He trained as a pediatric and biomedical scientist and holds a Distinguished University Professorship at the Liggins Institute of the University of Auckland. He has published over 700 scientific papers and several technical and popular science books. He has received the highest scientific (Rutherford Medal) and civilian (Order of New Zealand) honours in NZ, and numerous international scientific awards. In 2016 he received the AAAS award in Science Diplomacy. He is a Fellow of the Royal Society of London, a member of the National Academy of Medicine (USA) and a Fellow of the Academy of Medical Sciences (UK).



Tom De GROEVE

Deputy Head of Unit, Joint Research Centre, European Commission

TOM DE GROEVE, Ph. D., is Deputy Head of the Disaster Risk Management Unit at the European Commission Joint Research Centre.

Tom oversees research in support of EU and global policy on disaster risk management and climate change adaptation. He is an expert in science-policy interfaces and knowledge management. He has done research in crisis management and disaster reduction, including earth observation, modelling and ICT. Tom received his Ph.D. in Geomatics from Laval University in Quebec City, Canada, in 1999. His early work addressed near-real time humanitarian impact assessment of disasters globally, with the UN-EC cooperation project Global Disaster Alert and Coordination System and the Global Flood Detection System. He fostered international collaboration among scientists, practitioners and policy makers by starting several international networks such as the Global Flood Partnership. Tom's work on crisis management led to the creation of the European Crisis Management Laboratory, a facility to test and benchmark tools for situation awareness and collaboration among international and national organisations. His work directly contributed to the opening of the European Emergency Response Coordination Centre in 2013, the central hub for European Civil Protection. In 2013, he became team leader on disaster risk reduction, developing internationally renowned tools such as the Index for Risk Management (INFORM) and the Global Conflict Risk Index (2014). He contributed to various experts groups leading up to the Sendai Framework for Disaster Risk Reduction, in particular on Disaster Loss Data. In 2015, Tom pioneered a new way of working in partnership and was instrumental in the launch of the first knowledge centre of the JRC: the Disaster Risk Management Knowledge Centre (2015). Since 2015, Tom has been managing the work of the Disaster Risk Management Unit, which includes the Copernicus Emergency Management Service, the Global Human Settlement Layer and climate change adaptation.



Marga GUAL SOLER

Senior Project Director, AAAS Center for Science Diplomacy

MARGA GUAL SOLER, Ph.D., is a Senior Project Director in the Center for Science Diplomacy at AAAS, where she explores the power of science as a universal language to help break down barriers and build bridges between people and nations. She works with governments, universities, non-governmental and international organizations worldwide to connect scientists and engineers with policy and has trained thousands of emerging leaders to engage at the science-diplomacy nexus. Dr. Gual Soler serves on the Research, Innovation, and Science Policy High-Level Advisory Group to the European Commissioner, Carlos Moedas, and on the advisory board of the Horizon 2020 project "Inventing a shared Science Diplomacy for Europe. (InsSciDE)." She has received multiple awards and recognitions, including "100 Spanish Experts in Innovation" by Cotec Foundation, "40 Under 40 Latinos in Foreign Policy" by the Huffington Post, and "10 Latinas Think Big Innovators to Watch in 2016." Before joining AAAS, she was Arizona State University faculty and UNESCO consultant. Her professional activities have taken her to more than 40 countries, where she has spearheaded several initiatives to bridge science, policy and society across political, geographical, disciplinary, and cultural divides. In 2014, she founded the Science Slam Festival, an event combining science communication and the performing arts held in Spain, Mexico, Uruguay and Paraguay under the auspices of UNESCO. Dr. Gual Soler received a Ph.D. in biomedical sciences from the University of Queensland in Australia and a bachelor's and master's from the University of Barcelona in Spain, and is an alumna of the prestigious Global Competitiveness Leadership Program at Georgetown University. In 2019 she will participate in Homeward Bound, the largest-ever all-women expedition to Antarctica, to promote women in science diplomacy. Follow her on Twitter: @margagual.



Michael HALPERN

Deputy Director, Center for Science and Democracy, Union of Concerned Scientists

Michael has worked at the intersection of science and politics for 15 years, spanning three U.S. presidential administrations. Working closely with policymakers, NGOs, scientific societies, and leading scientists, Michael promotes policies that ensure government decisions are fully informed by independent scientific information and protect government scientists from political interference in their work. He oversees efforts to enable scientists to more effectively collaborate with policymakers and with communities, especially communities that bear disproportionate burdens of pollution. Michael has extensive expertise in defending scientists from harassment and creating conditions that make science and scientists more resilient to political, industry, and ideological influence. He speaks regularly on the use and misuse of science in decision making, ways of promoting or corroding scientific advice to governments, and the forces that drive attacks on science. He has published perspectives on politics and science in leading academic journals including *Science* and the *American Journal of Public Health*. Michael appears regularly in major media outlets, including the Associated Press, *The Boston Globe*, CNN, National Public Radio, *The New York Times*, and *The Washington Post*. He holds bachelor's degrees in sociology and communication studies from Macalester College in St. Paul, Minnesota.



Michinari HAMAGUCHI

President, Japan Science and Technology Agency

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



ZAKRI Abdul Hamid

Former Science Advisor to Prime Minister of Malaysia

Zakri was appointed to the Scientific Advisory Boards of both the UN Secretary-General and the President of the Islamic Development Bank (IDB), served for eight years as Science Advisor to the Prime Minister of Malaysia, and is a Vice-Chair of the Governing Council of the UN Technology Bank for Least Developed Countries. He was Joint Chair, Malaysian Industry-Government Group for High Technology (MIGHT). Zakri is a senior fellow of the Academy of Sciences Malaysia; fellow of The World Academy of Sciences, the World Academy of Art and Science, and the Islamic World Academy of Sciences; and Distinguished Fellow of the Global Federation of Competitiveness Council. For decades, Prof Zakri has contributed to the observation, analysis and evaluation of global biodiversity and ecosystem services, encouraging the restoration, protection and sustainability of the natural environment. He has provided strong leadership in discussions of biodiversity in the national and global arenas. From 2000 to 2005, he co-chaired with Sir Robert Watson the Board of the landmark UN Millennium Ecosystem Assessment (MA), one of the world's largest-ever scientific collaborations involving over 2,000 leading scientists in a comprehensive synthesis and analysis of the state of the Earth's ecosystems. Zakri became a driving force behind the creation of the UN-affiliated Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), an independent body established to bridge the gap between scientists and policymakers, providing up to date, accurate, impartial data and scientific information to enable better policy response in managing biodiversity. He was elected as the founding Chair of IPBES in 2013. Recognitions of his contributions to biodiversity have included the national Langkawi Environmental Award (1998) and the Merdeka Award (Environment) (2015). Internationally, he was awarded the Zayed Prize for the Environment (2014), the ASEAN Biodiversity Hero (2017) and the Midori Award for Biodiversity (2018). Three species are named after him: a beetle (*Paleosepharia zakrii*), a cicada (*Pomponia zakrii*) and a pitcher plant (*Nepenthes zakriana*).



Yuko HARAYAMA

Professor Emeritus, Tohoku University

Dr. Yuko Harayama is the former 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, OECD. She is a Legion D'Honneur recipient (Chevalier), and was awarded honorary doctorate from the University of Neuchâtel. Previously, 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, both from the University of Geneva.



Alexander Jacob HARRIS

Head of Global Policy, The Wellcome Trust

Alex Harris is the Head of Global Policy at the Wellcome Trust, where he leads a team of policy and advocacy experts working to create an environment where health research thrives and its benefits reach people across the world quickly. He oversees Wellcome's policy work on access to medicine and medicines quality, epidemic preparedness, emerging technology, data sharing and research uptake. Alex has over fifteen years' experience in global policy and advocacy, advising and influencing a wide range of healthcare organisations in the governmental, not for profit, and private sectors. Prior to joining Wellcome, he led an international NGO focused on access to medicine, advocating for greater collaboration between funders, governments and the private sector.



Haruo HAYASHI

President, National Research Institute for Earth Science and Disaster Resilience

Researchers at National Research Institute for Earth Science and Disaster Resilience (hereafter NIED) will be now deployed to the impacted site immediately when major natural disasters occur as the member of our national Information Support Team (ISUT). ISUT is a function of the disaster reconnaissance team of our national government which was established this summer. Since its establishment, ISUT has been deployed to Osaka earthquake in June, Western Japan Heavy Rain in July, and Hokkaido earthquake in September in addition to several exercises. This arrangement made possible as a result of recent achievements by NIED on the information sharing among emergency management organizations at disaster response phase to create a common operational picture by making use of Shared Information Platform for Disaster Management (we call SIP4D). SIP4D was developed by NIED as a web-based mechanism aimed at emergency management organizations to share information which is necessary for effective emergency response efficiently through the lessons from 2016 Kumamoto earthquake and 2017 North Kyusyu heavy rain. Some information comes from NIED information products using MOWLAS network such as shaking intensity distribution and estimated housing damage, and others were mashed up information created by various entities along with their emergency response activities such as road closure and shelter locations and the number of the people at each shelters.



Emily HAYTER

Programme Specialist & Acting Head, Evidence for Policy, INASP

As Programme Specialist and Acting Head of Evidence for Policy at INASP, Emily focuses on designing and managing capacity development projects to enhance the use of evidence in policy making. Most recently, she has been involved in pilots of the Context Matters Framework with public agencies in Ghana and Peru, a participatory diagnostic process to identify entry points for organisational change around evidence use. She was Programme Manager for INASP's 3-year DFID-funded Building Capacity to Use Research Evidence (BCURE) programme, VakaYiko, which was active in three Parliaments, three ministries/departments and a civil service training centre in Ghana, Uganda, South Africa and Zimbabwe. As part of this she worked with country partners on the design and implementation of capacity building programmes, co-authored a report on evidence use in African parliaments and led on the piloting, adaptation and implementation of the VakaYiko Evidence-Informed Policy Making Toolkit. Emily has also completed consultancy projects for organisations including OECD, UNDP, IPU and Mott MacDonald in research uptake in HIV prevention policy in southern Africa, evidence use in parliaments, and peer learning for institutional reform.

Emily has ten years' experience in the research and higher education sector in Africa, working with policymakers, researchers and civil society organisations. She holds a Masters in African Studies from the University of London's School of Oriental and African Studies (SOAS), focusing on African politics and political economy of development.

LinkedIn: <https://www.linkedin.com/in/emilyhayter/>



Eeva HELLSTRÖM

Senior Lead, The Finnish Innovation Fund - Sitra

Eeva Hellström is Senior Lead in Foresight and Strategy at the Finnish Innovation Fund Sitra, which is an independent and future oriented public think-and-do tank. Eeva is leading Sitra's Knowledge in Decision-Making project, which focusses on identifying changes needed in the knowledge-policy interface when dealing with increasingly complex social phenomena in a rapidly changing, digitalizing and volatile information environment. The Knowledge in Decision-Making project seeks to introduce new perspectives to the topic via societal analyses and dialogue. It also aims at competence building and exchange of experiences through a developer network. New interactive models where decision-making is infused by collective intelligence and interpretation are also developed and tried out in practice. Eeva has extensive experience in working in the knowledge-policy interface throughout her career, and on both sides of the interface. On several occasions she has, for example, chaired research and expert institutions, prepared policy reports for the government, acted as a knowledge broker and expert panel facilitator, and launched training programs for top-level decision-makers throughout the Finnish society. Eeva's personal development interests include the knowledge-policy interface, natural resources policy, sustainable economy, public governance and policy leadership, and societal change and transitions. Eeva Hellström is M.Sc in land use economics and D.Sc. in environmental economics from the University of Helsinki. Being also a forester by professional training, Eeva is still active in many positions of trust within the Finnish forest sector.



Pierre JAFFRE

President, AIRBUS Group Asia Pacific

Pierre Jaffre graduated from Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (Sup'Aero) in 1988 and spent two years at the California Institute of Technology, Pasadena - California, as Visiting Professor to perform researches on Hypersonic Combustion (program X30). In 1990, Pierre Jaffre entered the Délégation Générale pour l'Armement (DGA) / Istres Flight Test Center, where he eventually became test engineer in charge of tests & evaluations of new prototypes such as Tiger Combat Helicopter, NH90 Transport Helicopter, Mirage 2000-5 & Rafale multirole fighters. Pierre Jaffre then joined the International Directorate of DGA (DR) in 1995 where he was given the position of US/Canada desk officer before becoming Deputy Director "Asia - America - Africa". During this period, Pierre Jaffre was also appointed Executive Secretary of the inter-ministerial group on the Future Large Aircraft "European airlift programme" (known today as A400M). Pierre Jaffre was then posted to the French Embassy in Bangkok from January 1998 to January 2001 as DGA Regional Attaché for South East Asia. In February 2001, Pierre Jaffre joined the EADS Group as Managing Director of the EADS office in Malaysia. Pierre Jaffre was also appointed, in 2002, Chairman of Eurocopter Malaysia Sdn Bhd. In November 2005, Pierre Jaffre was appointed Vice President ASEAN and became President Asia Pacific in January 2014. Pierre Jaffre is Conseiller du Commerce Extérieur since 2003 and received the "Chevalier de l'Ordre National du Merite" Award from the French Government in December 2005. Pierre Jaffre is married to the former Florence Van Assche and they have two children, Eliot (24) and Daphne (20).



Matthias KAISER

Director, Centre for the Study of the Sciences and Humanities (SVT), University of Bergen

Prof. Matthias Kaiser is Director of the Centre for the Study of the Sciences and Humanities (SVT) at the University of Bergen, having studied at the Universities of Munich, Oslo, Stanford and Frankfurt. He is a Scientific Fellow at the European Academy of Technology and Innovation Assessment, Ahrweiler in Germany, and an elected member of the Humanistic Class of the oldest scientific academy in Norway: Det Kongelige Norske Videnskabers Selskab (Royal Norwegian Society of Sciences and Letters). His areas of expertise include: philosophy of science (Dr. phil.), ethics of science, and technology assessment. His areas of competence include social studies of science and technology, history of science, ethics, logic, and history of philosophy. His topics of interest include but are not restricted to: food ethics, risk, the precautionary principle, aquaculture, integrity in science, uncertainty & complexity, governance, value studies, energy, public participation, gm-organisms. During 1996-2002 he was Chair of ICSU's Standing Committee on Responsibility and Ethics in Science (SCRES). He has been involved in, and sometimes leading more than 15 EU funded projects. Kaiser is an internationally recognized specialist in all fields relating to ethics of science and technology, food ethics, and integrity of science. Kaiser is also Co-Editor-in-Chief of the scientific journal Food Ethics (Springer), and he is the past President of the European Society for Agricultural and Food Ethics (www.eursafe.org), as well as currently being actively engaged in international activities / projects concerning scientific integrity (e.g. the RINO project). He has been involved in science advice to the EU commission (through the SAPEA/SAM mechanism), to the Council of Europe, as well as several previous national functions. Kaiser has published widely, more than 180 articles. Google Scholar (Oct 2018) gives him: h-index = 20, i10-index = 29; citations > 1418.



Motoko KAKUBAYASHI

Press Officer, Kavli IPMU, The University of Tokyo

Motoko Kakubayashi is a press officer at the Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU), University of Tokyo. After graduating from Massey University, New Zealand, with a MSc in Physics in 2008, she found she was better at speaking up for science than doing it, and went on to obtain a Graduate Diploma in Journalism. She joined the founding team of the Science Media Centre of Japan (SMCJ) at Waseda University, Japan, in 2010. Soon, she was faced with the difficult task of helping scientific evidence find a way to the public in the aftermath of the 2011 Great East Japan earthquake, tsunami, and Fukushima Dai-ichi accident. Since then, Kakubayashi has worked as an investigator at the Center for Science Communication in the Japan Science and Technology Agency, looking at science communication from a policymaking perspective, before becoming an advocate for fundamental research at the Kavli IPMU since 2015. She continues to be a speaker and advisor at international science communication seminars and programs within Japan.



Mitsunobu KANO

Vice Executive Director, Chair of the SDGs Initiative Planning Committee/Professor, Okayama University

Dr. Kano has experienced clinical medicine including gerontology, research in medical engineering and pharmaceutical sciences, and public services including academy activities and governmental commitments. The public services led him to efforts in developing education for general sciences, including implementation of achieving the United Nations Sustainable Development Goals (SDGs) into university administration in Okayama University, where he works now. Dr. Kano graduated from and started research activity in University of Tokyo, did his clinical residency in St. Luke's International Hospital, and is now Professor and a Vice Executive Director in Okayama University. As the latter role he led the university to be awarded by the Japanese government for achieving the SDGs in 2017. Meanwhile he led to establish a new interdisciplinary graduate school focusing on the health care systems in the university including faculties from medical sciences, engineering, social sciences, and humanities, started in April 2018. Dr. Kano is in parallel the former Deputy Chair of the Young Academy Japan, and a former Executive Committee member of the Global Young Academy (GYA). He represented the GYA in the InterAcademy Partnership in 2016.



Anders KARLSSON

Vice President, Global Strategic Networks, Elsevier

Anders Karlsson, PhD, joined in 2012 Elsevier as Vice President for Global Strategic Networks, to support Elsevier's relations with key stakeholders in the Asia-Pacific region. Before joining Elsevier, he was for five years Counselor for Science and Innovation at the Embassy of Sweden in Tokyo (Japan), with a regional responsibility for Japan and South Korea.

Before serving as Science Counselor, he was for 10 years Professor in Quantum Photonics at the Royal Institute of Technology - KTH, Stockholm, Sweden. In year 2000 he was one of 20 researchers to receive the first Future Research Leader grant from the Swedish Foundation for Strategic Research. He also held a special research fellow position 2001-2007 with the Swedish Research Council. His work, leading a consortium on advanced information technology, was awarded the EU René Descartes Research Prize in 2004 for excellence in collaborative research. He has been Visiting Scientist/Teacher at NTT Basic Research Labs, Stanford University as a Fulbright Visiting Scholar, Ecole Polytechnique Paris, Zhejiang University and Advisor at Osaka University. He has a Ph.D. in Electrical Engineering and a M.Sc. in Engineering Physics, both from the Royal Institute of Technology - KTH, Stockholm, Sweden.

He has a strong interest in science communication and is a frequent speaker on topics such as research management, science and innovation policy, and in how results from science translate into societal impact.



Yasunori KIMURA

Principal Fellow, Center for Research and Development Strategy (CRDS), Japan Science and Technology Agency (JST) / Senior Fellow, Fujitsu Laboratories Ltd.

Mr. Kimura joined Fujitsu Limited in 1981. Since then throughout his career, he has been engaged primarily in computer system design and development, and was a lead in the computer architecture research group at Fujitsu Laboratories Ltd. Some of the projects he contributed to include: the development of parallel inference machines that was used in the Japanese fifth generation computer systems, parallelizing compilers for commercial servers, and supercomputers, one of which was later called as 'KEI Computer' that was developed under the supervision of RIKEN and the Ministry of Education, Japan.

He got transferred to Fujitsu Laboratories of America in California in November, 2009, and in 2011, was appointed as President and CEO where he led research projects in the areas of healthcare, smart energy, open education, SDN, and security. He returned to Japan in 2015, and became Fellow at Fujitsu Laboratories Ltd. He was appointed as Principal Fellow at Center for Research and Development Strategy (CRDS), JST (Japan Science and Technology Agency) in January, 2017, while keeping his fellow position (now Senior Fellow) at Fujitsu Laboratories Ltd. He spent a summer at Stanford University as a visiting scholar in 1995, and served as Visiting Professor at the University of Tokyo for four years from 2002, and at Kyushu University in 2009. Mr. Kimura holds a Ph.D. in Computer Science from the University of Tokyo.



Teruo KISHI

Science and Technology Advisor to the Minister for Foreign Affairs of Japan

Teruo Kishi is Science and Technology Advisor to the Minister for Foreign Affairs from September 2015. Concurrently, he is the President of Innovative Structural Materials Association (ISMA). He is also the Program Director for SIP (Cross-ministerial Strategic Innovation Promotion Program) at Cabinet Office, Government of Japan. He is NIMS Advisor Emeritus of the National Institute for Materials Science (NIMS) after serving as the first President of NIMS from April 2001 till June 2009 and Professor Emeritus, the University of Tokyo. Teruo Kishi received the degree of Doctor of Engineering from the University of Tokyo in 1969. His expertise is materials science, especially fracture mechanics and nondestructive testing of metal, ceramics and composite materials. He was Associate Professor, the Institute of Space and Aeronautical Science (ISAS), the University of Tokyo in 1974, Professor, the Research Center for Advanced Science and Technology (RCAST), the University of Tokyo in 1988, Director General of RCAST in 1995, and Director General of the National Institute for Advanced Interdisciplinary Research, Ministry of International Trade and Industry (MITI) in 1997. He was Vice President of the Science Council of Japan in 2003 and the President of the Japan Federation of Engineering Societies in 2007. He is also Advisor of Four University Nano-micro Consortium, Advisor of Tsukuba Innovation Arena, Director of Strategic International Program of Japan Science and Technology Agency (JST), Management Council Member of the University of Tokyo, Tohoku University and University of Tsukuba. At present, Teruo Kishi devotes to the research and development of structural materials such as steels, nonferrous metals, composite materials for automobiles and aircrafts at ISMA and SIP program, respectively. Teruo Kishi received the following awards: Fellow of the Society, the American Ceramic Society (1996), Officer de l'Ordre National du Merite, France (2004), Honda Memorial Award, Honda Foundation (2006), Barkhausen Award, Dresden, Germany (2007), Carl-von-Bach-Medal Award, Germany (2009), Distinguished Life Membership, ASM, USA (2010), Ostwald Fellowship, BAM, Germany (2010), and Fellow of the Japan Federation of Engineering Societies, etc.



Akihiro KISHIMURA

Associate Professor, Department of Applied Chemistry, Faculty of Engineering, Kyushu University / Chair of the Young Academy of Japan / Member of the Global Young Academy

Akihiro Kishimura received his B.S. degree under the supervision of Prof. M. Hidai from the University of Tokyo in 2000, and his PhD degree of engineering under the supervision of Prof. T. Aida from the University of Tokyo in 2005. He joined the research group of Prof. K. Kataoka in 2005 as a postdoctoral researcher, and became an assistant professor in Department of Materials Engineering, Graduate School of Engineering, The University of Tokyo in 2006. Then, he moved to Kyushu University as an associate professor in 2013. He joined Science Council of Japan in 2016, and has worked as the chair of Young Academy of Japan since 2017. He is a member of the Global Young Academy from 2017. The present research focuses on the synthesis and structural analysis of polymeric nano-/micro-structures especially in aqueous media based on supramolecular approaches. The novel materials have been designed and developed particularly for biomedical applications, such as biocompatible nano-carriers for targeted drug delivery system (DDS), advanced nanosystems for nano-pathophysiology, novel nano-structured microcapsules and so on. Very recently, his group has developed new strategy of protein delivery system and enzyme-driven nano-reactors for therapeutic applications, and cytosol-mimic liquid matrix for full utilization of biomolecules in the industrial and medical context.



Johannes KLUMPERS

Head of Unit "Scientific Advice Mechanism", European Commission

Johannes Klumpers leads the recently created Scientific Advice Mechanism Unit (SAM) in the European Commission.

The Unit supports the Commission's Group of Chief Scientific Advisors who, as their name suggests, give science advice to the European Commissioners. The Group of Advisors – with support by the Unit – collaborates in this endeavour with five European Science Academy Networks.

The Unit also supports the European Group on Ethics in Science and New Technologies (EGE), which also advises the Commissioners. Finally, the Unit develops policies on research integrity and assesses Horizon 2020 applications and projects according to their ethical and some legal characteristics.

A German National, born in Geneva in 1964, he studied forestry and wood technology and obtained his PhD 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 there on a variety of topics, from renewable raw materials and industrial processes to gender, science in society, finance and budget. He has been in his current post since its establishment, 1 October 2015.



Dalia KREIVIENĖ

Deputy Director, External Economic Relations and Economic Security Policy Department, Lithuanian Ministry of Foreign Affairs

Dalia Kreiviėnė is Deputy Director of External Economic Relations and Economic Security Policy Department at Lithuanian Ministry of Foreign Affairs (MFA). Prior to this position, she served as Deputy Head of Mission at the Embassy of Lithuania in France (2012-2015) and in various positions within the MFA. She has more than 20 years professional experience within the MFA in field relevant to external economic relations and economic security policy, last five years of which in field relevant to cooperation with the OECD and bilateral economic diplomacy, encompassing also science diplomacy aspects. She received her Master of Business Administration and Management at the Vilnius University; currently she is studying for her Executive MBA at the Baltic Management Institute. Since the beginning of her professional carrier at the MFA, she attended various professional training and courses related to international relations at National School of Public Administration (ENA, France), Korea Development Institute, Institute for European studies at Université Libre de Bruxelles.



Tahu Hera KUKUTAI

Professor, National Institute of Demographic and Economic Analysis at the University of Waikato, NZ

Tahu Kukutai is Professor of Demography at the National Institute of Demographic and Economic Analysis at The University of Waikato, New Zealand. She specialises in Māori and indigenous demographic research and has written extensively on issues of population change, identity, wellbeing and official statistics. Tahu is a founding member of the Māori Data Sovereignty Network Te Mana Rararunga that advocates for Māori rights and interests in data to be protected in an increasingly open data environment. In 2016 she co-edited (with John Taylor) Indigenous Data Sovereignty: Toward an Agenda (free download: <https://press.anu.edu.au>) and is Co-Chair of the Research Data Alliance International Indigenous Data Sovereignty Interest Group. Tahu has undertaken research for numerous indigenous communities and Government agencies, and provided strategic advice across a range of sectors. Most recently she was appointed to the Census 2018 External Data Quality Panel and the Child Wellbeing Strategy Reference Group that is informing the development of the New Zealand Government's first child wellbeing strategy. Tahu was previously a journalist.



David MAIR

Head of Unit, Joint Research Centre, European Commission

David has worked for the European Commission since 1995 and in the Joint Research Centre (the Commission's science and knowledge service) since 2011.

He is since July 2016 Head of one of the Knowledge Management Units, responsible for research and training on evidence for policymaking and for managing geographic knowledge.

Between 2011 and 2016 he was responsible variously for the JRC work programme, science advice to policy and for foresight. From April 2015 to December 2015 he was Acting Director for Policy Support Coordination.

From 1998 to 2011 he worked in DG Health and Consumers, 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. Before the Commission he worked for the UK Treasury in Brussels and London and has also worked in the City of London as a corporate financier and in the British Army. He studied History at Cambridge University. He is married with two daughters.



Apollonia MIOLA

Project Leader, European Commission - Joint Research Centre

Apollonia Miola is senior scientist at the Sustainable Resources Directorate of European Union - Joint Research Centre.

She leads the EU JRC research project on knowledge management for Sustainable Development Goals. She has been researching and developing climate change and sustainable development policy evaluation for more than 20 years. Presently the key focus of her research activity is on building a science policy interface on Policy coherence for Sustainable Development.

Before joining the EU Commission she was a senior researcher at the "Luigi Bocconi" University of Milan. She is author of many reports and peer reviewed papers in the field of climate change and sustainable development.



Rob MOORE

Executive Director, The Gauteng City-Region Observatory(GCRO), South Africa

Dr Rob Moore was appointed as Executive Director of the GCRO in 2016. Previously he was a Deputy Vice Chancellor at Wits University, a post he held for seven years. His work included responsibility for the advancement of the University's strategic purposes in partnership with other institutions in society. Among other things, he assisted in developing the relationships between Wits and partners in government, industry, civil society and other universities. He was project director for South Africa's Ministerial Review Committee on the National System of Innovation, a study conducted in 2010 and 2011 and published in 2012.

Prior to joining Wits, he spent twelve years (1992 – 2004) at the University of Cape Town researching and teaching in higher education studies. His research interests there focused on issues of higher education policy and institutional adaptation. In particular, he has published on issues of institutional responsiveness to policy, on curriculum reform, and (more recently) on the governance of knowledge partnerships.

He sits on the Boards of the Southern African Liaison Office (SALO), The Conversation Africa (TCA), the Centre for Sustainability in Mining and Industry (CSMI), and the Cradle of Humankind Trust (CoHT).



Jan Marco MÜLLER

Coordinator for Science to Policy and Science Diplomacy, IIASA

Following his PhD in Geography from the University of Marburg (Germany) in the year 2000, Jan Marco Müller's career included assignments as Assistant to the Scientific CEO of the Helmholtz Centre for Environmental Research (UFZ) in Leipzig (Germany), Research Programme and Communications Manager of the JRC Institute for Environment and Sustainability in Ispra (Italy), and Head of Business Development & Public Relations of the Centre for Ecology & Hydrology (CEH) in Wallingford (UK). During these years he also served as first Secretary of the Partnership for European Environmental Research (PEER), the network of Europe's largest environmental research centres which he co-founded.

In 2009 he broadened his experience at the science-policy interface by becoming the Assistant to the Director-General of the European Commission's Joint Research Centre (JRC) in Brussels until 2012, when he was asked to join the recently appointed Chief Scientific Adviser to the President of the European Commission. He served as Dame Anne Glover's Chief of Staff throughout her tenure, playing a key role in shaping the profile of the office. Following a 5-month fellowship with US science policy expert Roger Pielke jr. at the University of Colorado at Boulder, he helped between January 2016 and March 2017 to set up the European Commission's new Scientific Advice Mechanism (SAM) and its Group of Chief Scientific Advisors. In April 2017 he joined the International Institute for Applied Systems Analysis (IIASA) near Vienna (Austria) as Head of the Directorate Office and coordinator of IIASA's science to policy and science diplomacy activities.



Fabrice MURTIN

Head of Section, the Households Statistics and Progress Measurement Division, OECD

Dr. Fabrice Murtin is a Head of Section at the Organisation for Economic Co-operation and Development (OECD) in the Households Statistics and Progress Measurement Division. He is also an Associate Researcher at Sciences Po Paris. A French national, he holds a PhD from Paris School of Economics, and was a Mellon Postdoctoral Fellow at Stanford University prior to joining the OECD. His research has focused on well-being measurement, the long-term dynamics of economic development and economic policy. He published numerous articles in peer-reviewed journals such as the Journal of Economic Growth, Economic Policy, European Economic Review or the Review of Economics and Statistics.



Eugene MUTIMURA

Minister of Education, Republic of Rwanda

Hon. Dr. Eugene Mutimura is the Minister of Education in the Republic of Rwanda, and ensures that the Ministry of Education develops and implements policies that provide equal opportunities to Rwandans to access high quality education through world class learning facilities and renowned learning institutions. Dr. Mutimura previously worked at the Inter-University Council of East Africa, where he Coordinated the Eastern and Southern African Centers of Excellence project funded by the World Bank in 8 countries, to support research and education in 16 Universities. With substantial pedagogical and research experience, Dr. Mutimura oversees the Ministry of Education policies that underpin national agenda to collaborate with African colleagues to utilize technology to transform education and research, and advance scientific discovery to leverage national and regional labour market opportunities. Dr. Mutimura believes that the most valuable investment lies in education, and nurturing of talents for young scientists. With the support from the Government of Rwanda, and in collaboration with various partners, the Ministry of Education will continue to contribute and advocate for improved commitment and investments in science and research to advance policies that underpin Rwanda's vision to become a knowledge-based economy. In his role as Minister of Education, Dr Mutimura has national responsibility for policy and strategy related to Science, Technology and Innovation. As the co-chair of the National Council for Science and Technology, he directly supports the needed research studies, related to specific issues facing the country, to facilitate evidence based science policy advice.



Michiharu NAKAMURA

Counsellor to the President, Japan Science and Technology Agency

Dr. Nakamura served as Executive Vice President and CTO of Hitachi Ltd., and then assumed a position of Board of Director. Since October 2011, he was President of Japan Science and Technology Agency (JST). Currently, he is serving as the Counsellor to the President of JST. He is Deputy President of Engineering Academy of Japan and a member of the UN 10 Member Group supporting Technology Facilitation Mechanism for SDGs.



Toyoaki NISHIDA

Professor, The Graduate School of Informatics, Kyoto University

Toyoaki Nishida is Professor at Department of Intelligence Science and Technology, Graduate School of Informatics, Kyoto University. He received the B.E., the M.E., and the Doctor of Engineering degrees from Kyoto University in 1977, 1979, and 1984, respectively. His research centers on artificial intelligence and human computer interaction. He opened up a new field of research called conversational informatics in 2003. He edited and co-authored three books on conversational informatics and related topics from Wiley and Springer. Currently, he leads the Human-AI communication (HAIC) team at RIKEN Center for Advanced Intelligence Project (AIP). He is an associate editor the AI & Society journal. He serves as a senior member of the Conference Toward AI Network Society, Ministry of Internal Affairs and Communications (MIC), Japan.



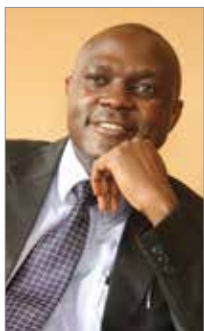
Connie NSHEMERIRWE

Co-Chair, Global Young Academy

Dr. Connie Nshemereirwe is an independent science and policy facilitator, and acts at the science-policy interface as a trainer, writer and speaker. She is the current Co-Chair of the Global Young Academy, as well as the Secretary General of the Uganda National Young Academy. She also sits on the steering committee of the Africa Science Leadership Programme (ASLP) based at the University of Pretoria in South Africa. Part of her other engagements involve working with the Partnership for African Social and Governance Research (PASGR) based in Nairobi, Kenya, delivering the bi-annual Pan-African Advanced Research Design Programme that is aimed at increasing the capacity of African Academics to carry out policy-engaged research.

Her undergraduate studies were in Civil Engineering, but in later years she made the shift to Education by completing a master's degree in the design of education and training systems at the University of Twente in the Netherlands in 2004, later followed by a PhD in Educational Measurement at the same University in 2014. Over most of this period she also had a dual appointment as a member of the academic staff in the Faculty of Education as well as the Faculty of the Built Environment at the Uganda Martyrs University, where she spent a total of 15 years.

She is also active in Civil Society through the Ugandan Think Tank, Kigo Thinkers, and in this capacity speaks at and attends various public engagement activities on the subject of adequacy and relevance of formal education in Uganda.



Mobolaji Oladoyin ODUBANJO

Executive Secretary, The Nigerian Academy of Science

Dr Oladoyin Odubanjó 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). Dr Odubanjó is an Adviser to the Centre for Palliative Care Nigeria (CPCN) and the Chairman of the Steering Committee of the African chapter of the International Network for Government Science Advice (INGSA). He also serves on the board of the West African office of The Conversation Africa.

Before working for the Nigerian Academy of Science, Dr Odubanjó worked as a physician for the Nigerian government. He worked at various public healthcare facilities in both rural and urban areas and was in charge of a general hospital with additional supervision of two primary health care facilities. In addition, Dr Odubanjó served on the board of some family-owned businesses. His experience also includes voluntary services for non-profit organisations in Nigeria and the United Kingdom.

Dr Odubanjó, as part of a newly recruited team, 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. He has also been a facilitator at training workshops for staff of African science academies on bridging the evidence to policy gap.



Takashi OGUCHI

Professor, Institute of Industrial Science, The University of Tokyo

Dr. Takashi Oguchi is a professor and Director of Advanced Mobility Research Center (ITS center), in Institute of Industrial Sciences, the University of Tokyo. He is also a member of Mobility Innovation Collaborative Research Organization (UTmobl) started on July 1st, 2018 in the university, which is aimed for interdisciplinary collaboration among different faculties in the university for wide range like engineering, law, social system, economy, psychology and so forth. He is in charge of education for the department of civil engineering, graduate school of engineering of the university. After receiving the PhD from the University of Tokyo in 1993, he joined the Nissan Motor Co. Ltd. He started to work in Tokyo Metropolitan University in 1995 and promoted to professor in 2007. He moved to the University of Tokyo in 2011 to join ITS center. His major research interests are Highway and Street/Avenue Planning and Design, Traffic Behavior Analysis, Traffic Operation Evaluation, Mobility Systems. He is also working as a head of Next Generation Urban Transport Working Group of Japanese national project SIP-adus (Cross-Ministerial Strategic Innovation Promotion Program in the Innovation of Automated Driving for Universal Services) since April in 2016.



Satoru OHTAKE

Adjunct Fellow, CRDS, JST/Visiting Professor, Policy Alternative Research Institute, The University of Tokyo

Satoru OHTAKE joined science and technology administration in the Government of Japan in 1984, just after graduating the Graduate School of the University of Tokyo where he was conferred Master Degree of Science in high energy physics. In his public service career in science administrations, he engaged in the policy planning and R&D management; establishment of Government's Science and Technology Basic Plans (in 1996, 2001 and 2011), establishing and running research programs and projects in photonics, mathematical science; engaging International Human Frontier Science Program in the HFSP Organization in Strasbourg in France between 1990 and 1992. He used to work in international collaborations, both bilateral and multilateral programs like Global Science Forum of OECD, Future Earth, Group of Earth Observation (GEO) and Global Earth Observation System of Systems (GEOSS). In Japan Science and Technology Agency (JST), he is in charge of management of international affairs, science and technology information exchange and dissemination, and science communication programs, in addition to overall management of JST as a deputy to the president from 2013 to 2015. After working as Executive Research Fellow in the Economic and Social Research Institute (ESRI) in the Cabinet Office where he studied the relation between science and society, he works as a visiting professor of Policy Alternative Research Institute of the University of Tokyo as well as Adjunct Fellow in Center for R&D Strategy of JST. In recent years he is working for with United Nations Sustainable Development Goals and emerging technology.



David Budtz PEDERSEN

Professor of Science Studies, Aalborg University

David Budtz Pedersen is Professor of Science Communication and Director of the Humanomics Research Centre in Copenhagen, Denmark. His research focuses on science and higher education policy, impact assessment, and evidence-informed policy-making. Dr. Pedersen is Strategic Adviser to the Danish Ministry of Higher Education and Science, as well as European institutions and research foundations. He has about 150 entries on his list of publications ranging from research papers, research monographs, edited volumes, policy reports, op-ed columns and newspaper articles. He has an international public presence with outreach activities in science policy, speaking frequently on the topic of knowledge mobilisation, knowledge exchange, and the use of metrics. He is the recipient of competitive grants from the Danish Council for Independent Research, The Velux Foundation, The Danish Ministry of Higher Education and Science, The European Commission Horizon 2020 and The Obel Family Foundation.



Roger PIELKE

Professor, the Center for Science and Technology Research, the University of Colorado, Boulder

Roger Pielke, Jr. has been on the faculty of the University of Colorado since 2001, where he teaches and writes on a diverse range of policy and governance issues related to science, innovation, sports. Roger holds degrees in mathematics, public policy and political science, all from the University of Colorado. In 2012 Roger was awarded an honorary doctorate from Linköping University in Sweden and was awarded the Public Service Award of the Geological Society of America. In 2006, Roger received the Eduard Brückner Prize in Munich, Germany in 2006 for outstanding achievement in interdisciplinary climate research. Roger served as a Senior Fellow of The Breakthrough Institute from 2008 to 2018. He has been a Distinguished Fellow of the Institute of Energy Economics, Japan since 2016. Before joining the faculty of the University of Colorado, from 1993 to 2001 Roger was a Scientist at the National Center for Atmospheric Research. His books include *The Honest Broker: Making Sense of Science in Policy and Politics* published by Cambridge University Press (2007), *The Climate Fix: What Scientists and Politicians Won't Tell you About Global Warming* (2010, Basic Books) and *The Edge: The War Against Cheating and Corruption in the Cutthroat World of Elite Sports* (Roaring Forties Press, 2016). His most recent book is *The Rightful Place of Science: Disasters and Climate Change* (2nd edition, 2018, Consortium for Science, Policy & Outcomes).



Ernest Fernández POLCUCH

Chief of Section for Science Policy and Partnerships, Natural Sciences Sector, UNESCO.

Ernesto Fernández Polcuch is a Science Diplomat, a specialist in Science, Technology and Innovation Policy, with a M.Sc. in Science, Technology and Society from the National University of Quilmes, Argentina. He is currently Chief of Section for Science Policy and Partnerships in the Natural Sciences Sector of UNESCO. In this position he manages global UNESCO programmes in Science, Technology and Innovation Policy, Science Communication, Gender and STEM, Science Diplomacy, and Science-Policy-Society linkages, including the UNESCO Global Observatory of STI Policy Instruments GO-SPIN, the UNESCO Science Report, the L'Oréal UNESCO For Women in Science Programme, and the STEM and Gender Advancement (SAGA).



Rémi QUIRION

Chief Scientist of Quebec

Professor Rémi Quirion is the inaugural Chief Scientist of Quebec and the President of the three Board of Directors of the Fonds de recherche du Québec since July 1st, 2011. A McGill Full Professor, Psychiatry and outgoing Scientific Director at the Douglas Mental Health University Institute. He served as Vice-Dean, Faculty of Medicine at McGill University, as well as Senior University Advisor (Health Sciences Research) in addition to being the CIHR Executive Director, for Alzheimer's Diseases, from 2009 to 2011. Prof. Quirion was the inaugural Scientific Director of the Institute of Neurosciences, Mental Health and Addiction (INMHA) until March 2009.

In addition to being on the Advisory Board of over 15 journals in Psychiatry, Pharmacology, and Neurosciences, he has published 5 books, more than 650 scientific papers and articles.

He received many awards and recognitions as: the Médaille de l'Assemblée nationale du Québec; Fellow of the Royal Society of Canada; and was appointed Fellow of the Canadian Academy of Health Sciences. In 2007 Prof. Quirion became a Member of the Order of Canada (O.C.).



Sujatha RAMAN

Associate Professor/Reader & Director of Research, Australian National University

Sujatha Raman is Reader/Associate Professor and Director of Research at the Australian National Centre for Public Awareness of Science (CPAS), The Australian National University (ANU), Canberra. She is interested in transdisciplinary approaches to the question of how we respond to global challenges in the face of diverse forms of knowledge, practice, and valuation. To this conversation, she brings expertise in studies of science policy, the use of scientific knowledge in policymaking, technology assessment, responsible research and innovation, and public engagement around science and technology. Her collaborations span the global North and South, and a range of domains including energy transitions, environmental change and sustainability, and health and antimicrobial resistance (AMR).

At CPAS-ANU, Raman is exploring collaborations for building capacity across the research, innovation, and policy ecosystem to facilitate democratic engagement around science, its impacts, and its futures. She is CPAS-ANU's lead in the Virtual Institute for Responsible Innovation (VIRI). Prior to joining ANU in July 2018, Raman was co-director of research at the Institute for Science and Society (ISS), University of Nottingham, United Kingdom. At Nottingham, she was deputy director (2012-16) and then director (2016-18) of the Leverhulme Research Programme, 'Making Science Public: Challenges and Opportunities', co-editing a book arising from this work (Science and the Politics of Openness, 2018, Manchester University Press). Other recent work has appeared in Environmental Science and Policy, Sociologia Ruralis, Environmental Communication, Journal of Rural Studies, Journal of Responsible Innovation, Policy Sciences, Energy Policy, Biomass and Bioenergy, Journal of Cleaner Production, World Development and Science as Culture. She tweets as @Sujatha__Raman.



Vardit RAVITSKY

Associate Professor, University of Montreal

Vardit Ravitsky, PhD, is Associate Professor in the Bioethics Program at the School of Public Health, University de Montreal and Director of Ethics and Health at the Center for Research on Ethics (CRE). Dr. Ravitsky is Vice-President of the International Association of Bioethics, member of the Standing Committee on Ethics of the Canadian Institutes of Health Research (CIHR) and of the Institute Advisory Board of CIHR's Institute of Genetics. She is also member of the National Human Genome Research Institute's (NHGRI) Genomics & Society Working Group. Previously, she was faculty at the Department of Medical Ethics at the University of Pennsylvania.

Dr. Ravitsky's research is funded by CIHR, FRQSC, SSHRC, and Genome Canada and she has published over 120 articles and commentaries on bioethical issues. Her research focuses on the responsible implementation of emerging genomics and reproductive technologies in terms of public policy. In her capacity as member of national and international advisory groups, she is heavily involved in strategic planning regarding research funding and research ethics. She is also heavily invested in and passionate about knowledge translation, having organized numerous cafés scientifiques and other public events to disseminate research findings. In 2017 she won the Researcher Knowledge Mobilization Award from the Québec Reproduction Network (RQR), granted "for knowledge translation activities designed to demonstrate the importance of research to the general public and to knowledge users".

Born and raised in Jerusalem, Ravitsky brings international perspectives to her research and teaching. She holds a BA from the Sorbonne University in Paris, an MA from the University of New Mexico in the US, and a PhD from Bar-Ilan University in Israel.



Daya REDDY

President, International Science Council

Daya Reddy was born in Port Elizabeth, South Africa. After completing bachelor's and doctoral degrees in engineering at the Universities of Cape Town and Cambridge respectively, he pursued postdoctoral study at University College London, then returned to Cape Town, where he migrated eventually from joint appointments in engineering and mathematics to a chair in applied mathematics. He currently holds the South African Research Chair in Computational Mechanics. Much of his work is concerned with mathematical analysis and computational simulation in solid and fluid mechanics, and is motivated by applications in areas such as materials science and biomechanics. His many publications include two graduate-level texts and a monograph, now in its second edition, on plasticity theory.

Daya Reddy was a founder member in 2003 of AIMS, the African Institute for Mathematical Sciences (AIMS), a pan-African network with centres for graduate education, research and outreach currently in five African countries. He currently serves as the chair of the AIMS South Africa Council.

Daya Reddy served a term as President of the Academy of Science of South Africa. He also serves as co-chair of the Research arm of the InterAcademy Partnership (IAP). In July of this year he was elected the first president of the International Science Council, the largest non-governmental science organization, which has resulted from the merger of the International Council for Science (ICSU) and the International Social Science Council.

He is a recipient of the Award for Research Distinction of the South African Mathematical Society, the Order of Mapungubwe, awarded by the President of South Africa for distinguished contributions to science, and of the Georg Forster Research Award from the Alexander von Humboldt Foundation in Germany.



Marc SANER

Full Professor and Chair, Department of Geography, Environment and Geomatics, University of Ottawa

Marc Saner is Full Professor and Chair, Department of Geography, Environment and Geomatics at the University of Ottawa, Canada (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 was the Inaugural Director of the Institute for Science, Society and Policy at the University of Ottawa and formerly held managing positions at the Council of Canadian Academies, Carleton University's Regulatory Governance Initiative and Ethics and Policy Issues Centre as well as the independent Institute on Governance.

He retains appointments as Adjunct Professor at Carleton University's Department of Philosophy and Fellow at the Balsillie School of International Affairs, University of Waterloo. Marc Saner holds a doctorate in applied ecology from the University of Basel, Switzerland (1991) as well as a masters in applied ethics from Carleton University, Canada (1999).



Marcelo Garcia SILVA

Adviser, Directorate of Energy, Science & Technology and Innovation (DECYTI), Ministry of Foreign Relations of Chile

Professor Marcelo Garcia Silva, Chilean lawyer from the Catholic University, with postgraduate studies in Philosophy and Political Science at the La Sorbonne University in Paris. Professor Garcia taught courses in International Politics at the University of Chile, in Santiago and at the Catholic University of Valparaiso. During the Military Dictatorship of General Pinochet, Marcelo Garcia left the country, occupying various academic positions abroad. First, as a guest researcher at the Max-Planck-Institut zur Erforschung der Lebensbedingungen der Wissenschaftlich-technischen Welt, (today, Max-Planck-Institut für Sozialwissenschaften), in München, Federal Republic of Germany. Later he moved to Mexico City, where he worked as a research professor at the Center for Teaching and Economic Research (CIDE). With the return of democracy in Chile, Professor Garcia returned to his country, where he worked as a teacher and entered as an Adviser at the Ministry of Foreign Affairs, on different topics of politics and economics, at the Directorate of Strategic Planning (DIPLANE). Professor Garcia was Representative of Chile at the Organization for Economic Cooperation and Development, (OECD, 2001-2006); Chief of the OECD Department at the Directorate of International Economic Relations (2006-2010), and Negotiator for the Chilean Accession of Chile to the OECD. Since 2014, Garcia is Senior Adviser at the Directorate for Energy, Science, Technology and Innovation (DECYTI) at the Foreign Ministry of Chile. Marcelo Garcia has also participated as editor and author of various publications and reports, both in Mexico and Chile, on issues of Institutional and International Cooperation Policy, Agro-Industry in the context of regional cooperation, OECD and Chile, Petroleum and alternative energy in Latin America, and Chile Insertion in the World Economy.



Alice SIRAGUSA

Project Officer, Joint Research Centre, European Commission

Alice Siragusa is project officer Joint Research Centre of the European Commission where she supports the extension of the LUISA territorial model to Africa and the production and dissemination of urban indicators. In the past, she has been collaborating with the Italian National Planning Institute (INU) on activities related to the SDGs and public space. She co-led the Habitat III Policy Unit 6 on Urban Spatial Strategies: Land Market and Segregation. She has been consulting the Italian Ministry of Infrastructures and Transport, visitor scholar at the Columbia University, and she had been a TA in Planning and Urban Design at University of Roma Tre. She holds a PhD in Regional and Urban Planning from Sapienza University of Rome.



Hema SRIDHAR

Chief Advisor - C4ISR, Ministry of Defence

Hema Sridhar is the Chief Advisor, Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) at the Ministry of Defence as part of the Capability Delivery Division. The Capability Delivery Division has primary responsibility to procure major military capability and manage major capability upgrades for the New Zealand Defence Force.

Hema has over ten years of experience in defence science and technology and expertise across the C4ISR domain with a focus on emerging and disruptive technologies. Hema has developed expertise in technology assessment and made a significant contribution to furthering several key acquisition projects.

Hema joined the Ministry of Defence in 2016 and in her role as Chief Advisor, supports a range of capabilities particularly with a technology focus and is a member on several project governance boards. Prior to joining the Ministry of Defence, Hema worked at the Defence Technology Agency.

Hema received a Master of Science in Physics and a Bachelor of Technology in Opto-electronics from the University of Auckland.



Anne-Sophie STEVANCE

Science Officer, International Science Council

Anne-Sophie is managing international science-policy activities related to the Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction and Biodiversity (IPBES). Within these processes, she coordinates inputs from the international scientific community and supports stronger interface between scientists and policymakers, in particular through the Science and Technology Major Group at the United Nations. Anne-Sophie has been leading at ISC the completion of policy-oriented reports on the SDGs. Following a 2015 Review of the SDG targets and a report on SDG interactions in 2017, she is currently involved with INGSA, IIASA and SEI in applying a framework for describing interactions to the national level in different country contexts to support the coherent implementation of the SDGs. Anne-Sophie is also currently coordinating the external review of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).



Vladimír ŠUCHA

Director-General, Joint Research Center, European Commission

Vladimír Šucha is Director-General of the Joint Research Centre of the European Commission, its in-house scientific service. He was Deputy Director-General of the JRC between 2012 and 2013. Prior to that, 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. Before joining the European Commission, he held various positions in the area of European and international affairs. Between 2005 and 2006, he was director of the Slovak Research and Development Agency, national body responsible for funding research. He was principal advisor for European affairs to the minister of education of the Slovak Republic (2004-2005). He worked at the Slovak Representation to the EU in Brussels as research, education and culture counselor (2000-2004). In parallel, he has followed a long-term academic and research career, being a full professor in Slovakia and visiting professor/scientist at different academic institutions in many countries. He published more than 100 scientific papers in peer reviewed journals.



Atsushi SUNAMI

Vice-President, National Graduate Institute for Policy Studies/ Executive Director, The Sasakawa Peace Foundation

Professor Sunami holds BSFS from Georgetown University. He obtained MIA and PhD in Political Science from Columbia University. He is currently Professor, and Vice President at National Graduate Institute for Policy Studies, Japan. He is serving as Special Advisor, Cabinet Office responsible for Science and Technology and Innovation and President and Executive Director, the Ocean Policy Research Institute, the Sasakawa Peace Foundation. Before joining GRIPS, he was a Fellow at Research Institute of Economy, Trade and Industry established by the Ministry of Economy, Trade and Industry, Japan between 2001 and 2003. He also worked as a researcher in the Department of Policy Research at Nomura Research Institute, Ltd. from 1989 to 1991. He was a visiting researcher at Science Policy Research Unit, University of Sussex, and Tsinghua University, China. He is also a member of the Advisory Board for the Promotion of Science and Technology Diplomacy in Ministry of Foreign Affairs of Japan, the Council for Science and Technology in Ministry of Education, Culture, Sports, Science and Technology and the Expert Panel on Basic Policy in Council for Science, Technology and Innovation of Cabinet office.



Haruo TAKEDA

Corporate Chief Engineer, Hitachi, Ltd.

Dr. Haruo Takeda is Corporate Chief Engineer of Hitachi, Ltd. He works also for 1) CAO (Cabinet Office, Government of Japan) as a member of artificial intelligence meetings, 2) MOFA (Ministry of Foreign Affairs) for SDGs (the Sustainable Development Goals), 3) METI (Ministry of Economy, Trade and Industry) where he chairs an adoption board for artificial intelligence in NEDO (New Energy and Industrial Technology Development Organization), 4) MEXT (Ministry of Education, Culture, Sports, Science and Technology) as a program officer for intelligent infrastructure for JST (Japan Science and Technology Agency), 5) MAFF (Ministry of Agriculture, Forestry and Fisheries) as a reviewer for all the research and development activities there. His lectures in 2018 include ones in 6) MIC (Ministry of Internal Affairs and Communications) on Information and Communication Technologies, and 7) FSA (Financial Services Agency) on Financial SDGs. He assumes himself playing a transdisciplinary role in the government.

He got his Doctoral Degree in mathematical engineering from the University of Tokyo where he wrote a machine learning program for the neural network for the game of go in 1980 when he was an undergraduate student. After joining Hitachi, he was the head of the R&D strategy center, the head of the Advanced Research Center and the head of the Technology Strategy Office prior to the current position.

For other institutions, he is the leader of the SDGs project in the Engineering Academy of Japan, an advisory board member of RIKEN, an advisory board member of the Future Society Initiative of the University of Tokyo, a strategy board member of IEC (International Electrotechnical Commission) for international standardization, was the chairman of the strategy board of the Japan Electrical Manufacturers' Association. He won the silver medal in Kanagawa prefecture (the first round) in the senior division of the international Chopin piano competition in Asia in 2017.



Kazuhiko TAKEUCHI

Vice-President, Science Council of Japan (International Activities)

Kazuhiko Takeuchi is President of the Institute for Global Environmental Strategies (IGES), Director and Project Professor of the Integrated Research System for Sustainability Science (IR3S) at the University of Tokyo, Senior Visiting Professor of United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS). He was a Vice Rector and Senior Vice-Rector of the United Nations University from 2008 to 2016. He has served, inter alia, as Chair of the Central Environment Council, Government of Japan, as Editor-in-Chief of the journal Sustainability Science (Springer Nature) and as Distinguished Chair of the Wangari Maathai Institute for Peace and Environmental Studies, University of Nairobi. Educated and trained as a geographer and landscape ecologist at the University of Tokyo, He engages in research and outreach activities on creating eco-friendly environments for a harmonious coexistence of people and nature, especially focusing on Asia and Africa. Recently, he has been working toward establishing a global foundation for developing the field of sustainability science aiming to build a sustainable society.



Akihiko TANAKA

President, National Graduate Institute for Policy Studies

Akihiko Tanaka is President of the National Graduate Institute for Policy Studies (GRIPS). Before assuming the current position, he had been Professor of International Politics at the Institute for Advanced Studies on Asia, The University of Tokyo, for many years. He served as President of Japan International Cooperation Agency (JICA) from April, 2012 to September, 2015. Mr. Tanaka was also Executive Vice President of The University of Tokyo (2009-2011). He obtained his bachelor's degree in International Relations at the University of Tokyo in 1977 and Ph.D. in Political Science at the Massachusetts Institute of Technology in 1981. He has numerous books and articles on world politics and security issues in Japanese and English including The New Middle Ages: The World System in the 21st Century (Tokyo: The International House of Japan, 2002) and Japan in Asia: Post-Cold-War Diplomacy (Tokyo: Japan Publishing Industry Foundation for Culture, 2017). He received the Medal with Purple Ribbon in 2012 for his academic achievements.



Klaus TILMERS

Senior Advisor, Science, Technology and Innovation, World Bank

Klaus works with the Office of the President to develop the Bank Group's corporate vision on disruptive technologies and their implications for development and to identify opportunities for scaling their adoption through lending operations, policy advice, and partnerships. In this capacity, he works closely with the UN Science Technology and Innovation (STI) Forum.

Most recently, Klaus served as Director of the Trade & Competitiveness Global Practice at the World Bank Group until December 2017. In this capacity, Klaus oversaw the delivery of solutions in Sub-Saharan Africa and the Middle East as well as the global teams on Trade & Competition Policy and Innovation & Entrepreneurship. Prior to this, Klaus held positions as Director of the Financial and Private Sector Development (FPD) Network; Knowledge Strategy Advisor; and Manager at the Independent Evaluation Group.

Klaus holds a Master's degree in Public Administration from Harvard University, and a Master's in Economics from the University of Mannheim.



Vaughan TUREKIAN

Executive Director of Policy and Global Affairs, US National Academies of Sciences, Engineering and Medicine

Executive Director of the Policy and Global Affairs (PGA) Division at the US National Academies of Sciences, Engineering, and Medicine. Dr Vaughan Turekian is Executive Director of the Policy and Global Affairs (PGA) Division at the US National Academies of Sciences, Engineering, and Medicine. Previously he served as Senior Director of the Program on Science and Technology for Sustainability within the PGA Division and prior to that, as the fifth Science and Technology Advisor to the U.S. Secretary of State. In this capacity, he advised the Secretary of State and other senior State Department officials on international environment, science, technology, and health matters affecting the foreign policy of the United States. From 2016 to 2017, he served as a country co-chair, along with the Kenyan Ambassador to the United Nations, for the Multi-stakeholder Forum on Science, Technology, and Innovation for the Sustainable Development Goals, a high-level discussion at the United Nations designed to accelerate progress toward globally agreed upon development targets. In 2018, Dr. Turekian was appointed by the U.N. Secretary General as one of the ten international members to promote the role of science, technology, and innovation for achieving for the 17 SDGs



Hiroshi UEDA

Director & Senior Managing Executive Officer, Sumitomo Chemical Company, Limited.

Hiroshi Ueda is currently a member of the Board of Director & Senior Managing Executive Officer at Sumitomo Chemical. He is in charge of Research and Development, Process & Production Technology & Safety Planning, Intellectual Property, and Responsible Care. He previously was in charge of Energy and Functional Materials Sector. He is a Senior Professional Chemical Engineer. He serves as the Committee member, COCN (Council on Competitiveness-Nippon) Working Committee. He completed the first half of the Ph.D. program at the Graduate School of engineering, Kyoto University.



Abhimanyu VEERAKUMARASIVAM

Professor/Doctor, Department of Biotechnology, School of Science and Technology, Sunway University

Professor Dr. Abhi Veerakumarasivam is a University of Cambridge-trained educator, science communicator and geneticist. His research in cancer genetics involves the elucidation of components of the regulatory pathways that drive tumour recurrence and invasion as well as dissecting Asian genetic variations that confer differences in disease-risk and response to therapy. In recognition of his achievements, he has been awarded multiple awards including the National Cancer Council Malaysia Cancer Research Award and the Merdeka Award Grant. He was crowned the Best Science Communicator at the 2016 International Famelab Finals in the UK. He is currently the Chairman of the Young Scientists Network-Academy of Sciences Malaysia (YSN-ASM) that represents top young Malaysian scientists who not only demonstrate academic excellence but also contribute towards nation-building through STEM promotion and advocacy. He is also currently the Chair of INGSA Asia Steering Committee and a member of the Global Young Academy; where he co-chairs the DIY Biology Working Group. Abhi truly believes that the greatest healthcare challenges facing us in the 21st century can only be addressed through an interdisciplinary approach that promotes effective communication and the translation of scientific discoveries and enabling technologies that improve the quality of life and promote social justice.



Matthew WALLACE

Senior Program Officer, International Development Research Centre (IDRC)

Dr. Matthew Wallace is currently a Senior Program Officer at International Development Research Centre (IDRC), in Ottawa. He works in the Foundations for Innovation program, where he manages a portfolio of projects in Latin America and Africa on issues such as science advice, multilateral and industrial research collaborations, the role and capacity of granting councils, and science careers, particularly among marginalized groups. Matthew has Masters' degrees in Physics and in Science and Technology Studies, as well as a Ph.D. in the History of Science. He has been a researcher and practitioner in the field of science policy for over a decade. Much of his research has focused on qualitative and quantitative tools for research evaluation and agenda-setting, tracing the development of new fields of research, and the politics of public research management, particularly in government settings. He has also previously worked as a science policy advisor and a senior evaluator at a federal ministry and at a granting agency in Canada.



Carla Leanne WASHBOURNE

Lecturer in Environmental Science and Policy,
Department of Environment Science, Technology, Engineering, and Public Policy, University College London

Carla is an interdisciplinary researcher and practitioner working at the interface of science and public policy. Her work seeks to understand how decision-making and planning in urban settings is influenced by prevailing knowledge systems, centred on urban environment and sustainability topics. Carla is a Lecturer in Environmental Science and Policy at University College London (UCL), in the department of Science, Technology, Engineering and Public Policy (STePP) a member of the UCL City Leadership Laboratory and a Co-Director (Green Infrastructure) of the UCL Engineering Exchange (<https://www.ucl.ac.uk/engineering-exchange>), which works to proactively match local community needs with UCL research expertise. She is a Research Associate at the Gauteng City-Region Observatory (GCRO), Johannesburg. Carla has previously worked in the UK Parliamentary Office of Science and Technology as a Physical Sciences Advisor and in the Scottish Parliament Information Centre, engaging directly with legislative decision-makers, developing expertise and personal interest in science advice and science communication for policy. Carla is engaged in GCRO core project 'Knowledge partnerships for urban futures: policy-oriented research alliances', investigating global and local practice in forging university knowledge alliances for policy making. A collaboration with GCRO, the University of Melbourne and UN-Habitat is developing theoretical and practical understanding of the role of urban observatories as a component of urban knowledge systems. Other current projects include an investigation of the knowledge and skills landscape in the design, development and management of urban green spaces and mechanisms for improving planning and policy implementation. Carla completed a PhD in Geosciences and MSc in Engineering Geology at the University of Newcastle (UK) and a BSc (hons) in Natural Sciences at Durham University.



Christine WEIDENSLAUFER

Attorney at Law/ Legislative Advisor, the Library of Chile's National Congress

Christine Weidenslauffer is an attorney at law and legislative advisor on Comparative Law, as full time staff of the Parliamentary Technical Advisory section at the Library of Chile's National Congress, since 2007. Ms. Weidenslauffer received her law degree from the University of Valparaiso, Chile, in 2003. She has an LLM on International and Comparative Law from St. Mary's University, San Antonio, Texas (2005), and an LLM in Advanced Legislative Studies from the University of London (2018), specializing in legislative drafting in common law countries and, in general, in the United States, Australia, Canada, and the United Kingdom legal systems. In her role as legislative advisor, Ms. Weidenslauffer has been strongly involved in the understanding and adoption of foreign legal transplants in the legislative process, through constant delivery of written reports and verbal assessment to members of Congress, legislative committees, Congress' officers and member's staff. Additionally, during the past few years, Ms. Weidenslauffer has worked in collaboration with her colleague, scientific journalist Raimundo Roberts, on science, technology and communications assessment in legislation. Aiming to improve the drafting law process and the adequate use of legal transplants, Ms. Weidenslauffer presented her paper "Research and Law Drafting Best Practices for Connected and Cooperative Parliamentary libraries", at the 2016 Annual Conference of the International Federation of Library Associations and Institutions (IFLA) in Columbus, Ohio, where she proposes creating an electronic information search tool, of a collaborative nature, among parliamentary researchers from different jurisdictions. While proficient in English, Spanish and Portuguese, and honoring her ancestry, Ms. Weidenslauffer is embarking on a new challenge: learning German! She currently resides in Santiago, Chile, with her husband and their three daughters. You can reach her at cweidenslauffer@bcn.cl or christy.weidens@gmail.com.



Rebekah WIDDOWFIELD

Chief Executive, Royal Society of Edinburgh

Rebekah has been Chief Executive of Scotland's National Academy, the Royal Society of Edinburgh, since September 2017. Following a geography degree at the University of Oxford and PhD at the University of Newcastle, Rebekah worked for a number of years at the Universities of Bristol and Cardiff before deciding to leave academia to pursue a more applied research career. Rebekah joined the Scottish Government as a senior researcher in 2001, working in various roles before becoming a senior civil servant in 2008 in which capacity she served as Head of Rural and Environmental Science and Analysis (RESAS) and as Chief Researcher with responsibility for social research in Government.

As Head of RESAS, Rebekah was at the interface between science and policy with responsibility for enhancing the impact and value for money of the Government's £60 million strategic scientific research programme delivered by Scotland's four research institutes. This included helping establish the Centre of Expertise on Climate Change – a collaboration of 19 institutions aimed at enhancing evidence for policy – and ensuring delivery of integrated, high quality analysis (drawing on both natural and social sciences produced in-house and externally) in support of rural and environmental policy including reform of the Common Agricultural Policy and transition to a low carbon economy. Rebekah moved to a policy role within the Scottish Government in 2013 becoming a commissioner and user of evidence, as Head of Higher Education and Science and, most recently, as Head of Better Homes with a wide-range of responsibilities including housing welfare reform, regulation of the private and social rented sector, fuel poverty and homelessness. As CEO of the RSE, Rebekah is committed to effective delivery of RSE's mission of 'knowledge made useful'.



James WILSDON

Vice-Chair, INGSA/ Professor of Research Policy, University of Sheffield

James Wilsdon is Professor of Research Policy at the University of Sheffield and vice-chair of the International Network for Government Science Advice (INGSA). From 2013 to 2017, he chaired the UK's Campaign for Social Science, and led an independent review of the role of metrics in the management of the UK's research system, which published its final report as The Metric Tide. Previously, he worked as Professor of Science and Democracy at the Science Policy Research Unit, University of Sussex (2011-2015); Director of Science Policy at the Royal Society, the UK national academy of science (2008-2011); and Head of Science and Innovation at the think tank Demos (2001-2008). His research interests include the role of evidence & experts in policymaking; interdisciplinarity; research policy in the UK and Europe; the impact agenda; and public engagement in research. In 2015, he was elected a Fellow of the UK's Academy of Social Sciences and he now chairs its Policy Working Group. He is on twitter @jameswilsdon.



Kenichiro YAMAGUCHI

Senior Manager, CDP Worldwide-Japan

Kenichiro Yamaguchi is Senior Manager at CDP Worldwide-Japan, responsible for promoting Supply Chain Programme in Japan. Ken is also serving as partner of "Megawatt-X", which is an internet platform venture to intermediate trades of secondary renewable assets. Before entering to the current career path, Ken had developed long term, strong careers in commodity and energy trading business in investment banking arena.

After graduating from Keio University (BA Economics) in 1982, Ken started professional career at the Bank of Tokyo Ltd (Name at that time). In 1991, Ken moved to J.P. Morgan in Tokyo and was promoted as head of commodity business to cover Asia & Pacific region at Singapore office in 1996.

In 1998, Ken was invited by Tokyo-Mitsubishi International PLC (Name at that time) in London to run global commodity business as Executive Director. Ken ran the business for 5 years and established a small-sized efficient trading group. In 2003, having full supports from Mitsubishi Corporation, Ken established an energy derivatives trading company named "Petro-Diamond Risk Management Ltd" and managed the company as President & COO for 6 years in London. The company has become highly efficient and profitable trading company. In 2010, Ken moved to Deutsche Bank and engaged in commodity structuring and emission trading. He worked for Deutsche Bank as Director until 2014.

Through learning about emission trading, Ken wanted to pursue his expertise in environment area and enrolled master to study Environment and Sustainability at Birkbeck College, University of London, and completed MSc in 2016. Then his current career path in environment has started.

Rapporteurs

Amal Amin Ibrahim Shendi Nada
Mahesh Kumar
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George Asiamah

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Akifumi UEDA, Representative, Citizen Science Initiative Japan (CSIJ)

Hiroyuki YOSHIKAWA, President, Japan Science Support Foundation; Member, The Japan Academy

Takashi YOSHIMURA, Director, Industrial Technology Bureau, Keidanren (Japan Business Federation)

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International Network for Government Science Advice (INGSA)

Kristian ALLEN
Lara COWEN
Grant MILLS

National Graduate Institute for Policy Studies (GRIPS) & Japan Science and Technology Agency (JST)

Tateo ARIMOTO (GRIPS/JST)
Masahiro KURODA (GRIPS/JST)
Satoru OHTAKE (JST)
Michiko IIZUKA (GRIPS)
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