International Science Council

The global voice for science

ANNUAL REPORT 2021

Work with the ISC to advance science as a global public good.

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The cover photo is from research in Kachchh, western India, by the TAPESTRY project, part of the Transformations to Sustainability (T2S) programme. TAPESTRY is working in three different areas across India and Bangladesh to study transformation as praxis, by putting bottom-up change and the agency of marginalized people at the centre. Find out more about TAPESTRY.

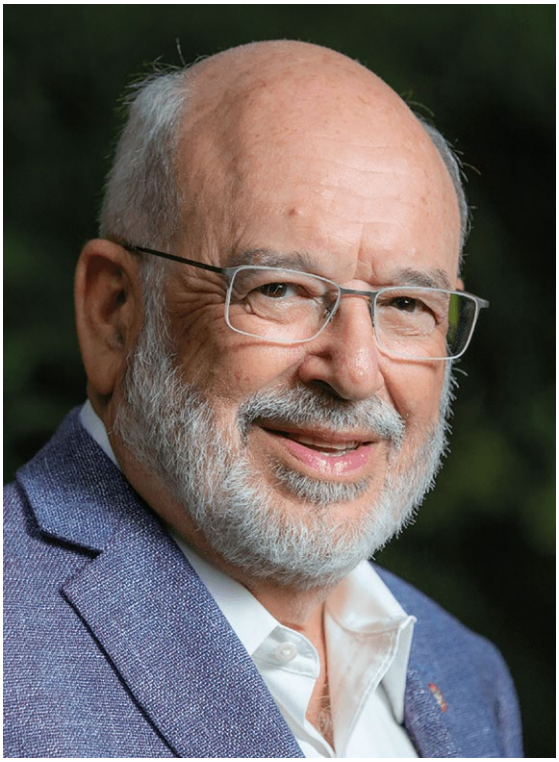
Photo: Ranit Chatterjee.

The vision of the International Science Council is to advance science as a global public good. Scientific knowledge, data and expertise must be universally accessible and their benefits universally shared. The practice of science must be inclusive and equitable, as should opportunities for scientific education and capacity development.

The International Science Council (ISC) is a non-governmental organization with a unique global membership that brings together 40 international scientific Unions and Associations and over 140 national and regional scientific organizations including Academies and Research Councils.

CONTENTS

MESSAGE FROM THE PRESIDENT AND THE ACTING CEO



We write the introduction to this report of the ISC's activities in 2021 against the backdrop of war in Ukraine, with distressing loss of life and consequences of concern for the whole of the scientific community. At times like this, we are reminded of the fundamental value of science as a method of building knowledge and shared understanding, and of the importance of international scientific collaboration for jointly working to resolve challenges that are too big for one discipline or one nation to apprehend.

This report highlights some of the ISC's key successes in working to uphold these values throughout 2021. A look across the ISC's portfolio of projects and outputs from the year provides an insight into the complex, changing landscape for science and its relationship to society, and demonstrates how the ISC is responding to the acute need for science that is engaged with societal concerns.

The year 2021 began with Bouncing Forward Sustainably – Pathways to a post-COVID world, which was launched in January. This project, which was co-led by the ISC and the International Institute for Applied Systems Analysis (IIASA), grappled with one of the most crucial concerns for policy-makers throughout the year, and a key theme running through all our work: identifying sustainable, equitable pathways out of the COVID-19 pandemic. In February, an article published in *The Lancet* launched a new ISC project to examine a range of scenarios for COVID-19 outcomes over the mid- and long term that aim to assist our understanding of the options for achieving an optimistic and fair end to the pandemic.

While COVID-19 continues to affect our ability to convene in the traditional way, the ISC has made the most of remote connection tools and strengthened digital capacity in order to redouble its efforts across a range of projects and activities delivered in partnership. 2021 has been a year of transition for the ISC, and when Members gathered for the well-attended General Assembly in October 2021, a new Governing Board was appointed and a new Action Plan for 2022–2024 was finalized. This will set the direction of the Council's activities over the coming term and, together with the Governing Board and supported by the Secretariat team, we are already working to implement the Plan.

We thank the Council's first Governing Board, and especially inaugural President of the Council, Daya Reddy, for establishing such a clear vision and strong mandate for the ISC in the first three years following its launch in 2018. We also thank the inaugural Chief Executive Officer, Heide Hackmann, who worked tirelessly to lead the organization through the merger process and to establish an impactful portfolio of scientific projects. Their work was instrumental in putting the Council on a strong footing organizationally, with an inspiring vision of science as a global public good. This vision, which had first been set out in the Council's High-Level Strategy published in 2018, has now been strengthened by a position paper on Science as a Global Public Good, published in October 2021. The paper examines the fundamental responsibilities of scientists, and the roles that science plays in society, and serves to inform all of the Council's activities.

A new chapter for the International Science Council

With a clearly articulated vision, a strong organizational footing and a new Action Plan to guide the Council's work to the end of 2024, we have a springboard from which to scale up the ISC's activities and continue to raise its public profile.

A crucial aim for the coming years will be for the Council to become more effective in the multilateral system, informed by the recommendations in the Report on ISC strategy in the intergovernmental system, which was published in late 2021 and endorsed by ISC Members at the General Assembly.

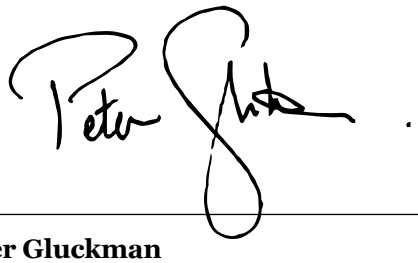
This work will also depend on building a stronger public profile for the ISC, and raising awareness of what the Council does with scientists worldwide, including those who are already engaged with ISC Members and those who are not. Our partnership with BBC StoryWorks for Unlocking Science has allowed the ISC to reach an unprecedented online audience: we must work to build on this, and to reach new communities that are curious about science and what it can deliver.

This kind of public engagement with science will be crucial to addressing the most urgent challenge of our time: accelerating action to reduce greenhouse gas emissions at the same time as advancing human development so that everyone, everywhere can thrive within planetary boundaries.

There is now broad recognition that responding to this challenge and achieving the goals of the 2030 Agenda will demand game-changing collective action from all actors, including within science systems. The ISC took an important step towards this goal in 2021 with the publication of Unleashing Science: Delivering Missions for Sustainability, which makes a compelling case for going beyond business-as-usual approaches towards structuring, funding and carrying out scientific research. In order to meet these aims, the ISC has established the Global Commission on Science Missions for Sustainability, a panel of thought-leaders co-chaired by Irina Bokova, former Bulgarian Foreign Minister and Director General of UNESCO, and Helen Clark, former Prime Minister of New Zealand and previous administrator of the United Nations Development Programme.

The Commission is tasked with identifying the most appropriate institutional arrangements and funding mechanisms required to mobilize support for a global fund of US$100 m per year for mission-oriented science as part of the Decade of Global Sustainability Science Action.

This is an ambitious aim, which calls for joined-up action and commitment from across the science system, and the full engagement of the ISC Members and wider network. We thank all members of our community for your support through 2021, and look forward to working closely with you in the year ahead.



Peter Gluckman
President, International Science Council

Mathieu Denis
Acting Chief Executive Officer, and Science Director, International Science Council

'Serving the ISC in its inaugural three-year period has been a distinct and unique privilege. From the outset, we seized this idea of a new merged organization that would be more than the sum of the old – with its own vision of science as a global public good, and eventually an action plan that gave concrete effect to this vision. It has been a stimulating journey on which I have learnt so much about our Unions, Academies, Associations and Councils. I am grateful for your support, ideas, your commitment to the ISC, the frequent opportunities to be involved in your activities, and the opportunity to serve and work with you. I acknowledge the unstinting support of Governing Board members in our various endeavours. It is a pleasure also to acknowledge with thanks the support, commitment and dedication to the ISC of the members of the secretariat under the leadership of CEO Heide Hackmann.

As we proceed into the period of the second Board, the societal challenges that the first Governing Board confronted remain, in large part, but there is a sense of increased urgency: we are three years closer to the target date for achieving the Sustainable Development Goals (SDGs), and there is growing alarm about lack of progress towards staying below the 1.5°C temperature increase. We witness an amplification of the threats to science posed by misinformation and scientific nationalism, which seek to undermine the core values of science. And, of course, we have had the significant wake-up call of COVID-19. We have also woken up to the need for self-examination, and of identifying and responding to discriminatory practices. The ISC has achieved a great deal over the past three years, is in good shape, and well placed to respond with vigour in addressing these and new challenges'.

Daya Reddy
Inaugural President of the ISC from 2018-2021

In late 2021, ISC Members were informed that Heide Hackmann had decided to step down from her role as Chief Executive Officer of the International Science Council. She had held this position since the creation of the Council in 2018, having previously served as Executive Director of the ISC's two predecessor organizations: the International Social Science Council (ISSC), from 2006 to 2015, and the International Council for Science (ICSU), from 2015 to 2018.

'Preparing for the 2021 General Assembly gave us an opportunity to reflect on the immense amount of work that has taken place since the launch of the International Science Council in 2018. In October 2021, when we met online together with member representatives from around the world, Patrons of the ISC, and representatives of the organizations that we have built new partnerships with over the past few years, it was clear how much we had achieved since the founding ISC General Assembly in Paris three years earlier.

The ISC was launched with the ambition for the natural and social sciences to come together to form a new organization that would create a unified and therefore stronger global voice for science, better equipped to address major issues of global concern to both science and society. The Governing Board and Secretariat were tasked with giving substance to that vision, working together with Members to develop new projects and new ways of working. We were called upon to deepen and expand the networks and convening power of the Council, and to undertake new projects that would amplify the vision and mission of the Council globally. The major reports produced during the past three years, such as Rethinking Human Development, the Hazard Definition and Classification Review, and Opening the record of science: making scholarly publishing work for science in the digital era were developed through new international steering groups and partnership agreements, including with UNDP and UNDRR. The work of the Global Forum of Funders and establishment of the Global Commission on Science Missions for Sustainability further demonstrates how the Council has expanded its reach to advance science that has the potential to create real impact on the most challenging and pressing issues facing policy-makers and societies today.

Implementing a new portfolio of projects at the same time as maintaining the Council's long-standing support for a diverse range of networks and programmes has been both challenging and rewarding. We have professionalised the functions of the secretariat, strengthening the team without significant expansion. This was especially necessary when the COVID-19 pandemic hit, forcing us to shift our ways of working and adapt to the new and urgent questions requiring scientific input. The effects of the pandemic on scientific research and science systems are far from over, and I am confident that the Council will be ready to be at the forefront of understanding and responding to this evolving challenge in years to come. When the Council was launched in 2018, we couldn't have imagined how far the world would have changed in just three years' time, but responding to the COVID-19 pandemic has made clear that open, inclusive and international scientific collaboration is essential, and that scientific knowledge has a unique role to play in addressing global challenges of this proportion.

My new position takes me back to my homeland to work for the future of science in Africa. I hope it will be possible to continue my engagement with and support for the ISC in the shared enterprise of promoting science as a global public good.'

Heide Hackmann
Inaugural Chief Executive Officer,
2018-2022

Heide Hackmann stepped down from her role as CEO in February 2022. In recognition of her remarkable contribution to international science, the ISC Governing Board is establishing the Heide Hackmann Science Policy and Diplomacy Fellowship, which will be launched in 2022.

THE ISC VISION AND MISSION

The vision of the ISC is of science as a global public good. Scientific knowledge, data and expertise must be universally accessible, and their benefits must be universally shared. The practice of science must be inclusive and equitable, also in opportunities for scientific education and capacity development.

The mission of the ISC is to act as the global voice for science. As part of that mission, the ISC:

- Speaks for the value of all science and evidence-informed decision-making;
- Stimulates and supports international scientific research and scholarship on major issues of global concern;
- Articulates scientific knowledge on such issues in the public domain;
- Promotes the continued and equal advancement of scientific rigour, creativity and relevance in all parts of the world;
- Defends the free and responsible practice of science.

SCIENCE AS A GLOBAL PUBLIC GOOD

Science is one of the most powerful global public goods: a source of beneficial and applicable knowledge that is freely available and accessible worldwide, and can be used by anyone, anywhere, without preventing or impeding its use by others.

Societies worldwide have faced complex, urgent challenges throughout 2021: increasingly dangerous climate change, the 'long tail' of the COVID-19 pandemic and sweeping technological change. Against this backdrop, the ISC published a position paper that expanded on its vision of science as a global public good, and the implications of that vision for how science is conducted and used, and the roles that science plays in society. The paper provides a foundation to inform all of the ISC's activities to support and maintain ethical practice in science, and to advance science that responds to the needs of society. The paper is also available in translation.

2021 BY THE NUMBERS

1 Lovie award

74 press citations

106 languages available on our website

224 members worldwide

4,588 virtual event registrants

24,826 podcast listeners**

543,560 video viewers***

12.1 million social media impressions*

*This includes data on the ISC-BBC StoryWorks content to 13 January 2022.
**This includes data to 31 March 2022 for the *Nature* 'Working Scientist' series.
***This includes data to 9 January 2022 for BBC StoryWorks videos.

1 GLOBAL SUSTAINABILITY

The year 2021 was a pivotal moment for science and policy on issues relating to climate change and biodiversity. As countries around the world sought to recover from the COVID-19 pandemic, there was a window of opportunity to 'build back better' and transform to more sustainable, more equitable and more resilient societies and economies.

Mangroves

Photo: Mohmed Nazeeh / Unsplash

'Science is a critical lever for achieving the Sustainable Development Goals. To make the societal transition towards sustainability, we need to unleash the full potential of science.'

Irina Bokova
Former Bulgarian Foreign Minister and Director General of UNESCO

The Global Commission on Science Missions for Sustainability

Meeting the goals of the 2030 Agenda for Sustainable Development and securing a just and sustainable future will depend on a massive mobilization of sustainability science globally. In order to meet this goal, in 2021 the ISC launched the Global Commission on Science Missions for Sustainability. The Global Commission is co-chaired by Irina Bokova, former Bulgarian Foreign Minister and Director General of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and Helen Clark, former Prime Minister of New Zealand and previous administrator of the United Nations Development Programme. The Commission is tasked with co-designing and mobilizing support for a global fund of US$100 m per year for mission-oriented science.

The launch of the Commission represents the ISC's contribution to the evolution of the Decade of Global Sustainability Science Action launched in 2019 and enabled by the Global Forum of Funders. This is an open platform that seeks to scale up collective action within funding and science systems throughout the world in order to maximize the impact of science towards the implementation of the Sustainable Development Goals (SDGs). The second Global Forum of Funders, which was held remotely in April 2021, resulted in finalization of the *Unleashing Science: Delivering Missions for Sustainability* Report and *A Synthesis of Research Gaps for science to enable societies to accomplish the Sustainable Development Goals by 2030*.

The *Unleashing Science* report sets out an ambitious approach to produce actionable knowledge through a set of sustainability science missions in the critical areas of food, energy and climate, health and wellbeing, water, and urban areas. The findings are based on an open global call for input led by the ISC through 2020.

Following the launch of the Commission in December 2021, the Technical Advisory Group has started work. The Commission will report in 2023.

Bouncing Forward Sustainably: Pathways to a post-COVID world

One question dominated science-policy discussions more than any other in 2021: how could the multi-trillion-dollar COVID-19 recovery packages be implemented in a way that would support resilience and sustainability for the long term?

The International Institute for Applied Systems Analysis (IIASA)-ISC Consultative Science Platform 'Bouncing Forward Sustainably: Pathways to a post-COVID world' mobilized the science communities of both the IIASA and the ISC to design sustainability pathways for the COVID-19 recovery period and beyond. Four thematic reports were released in January 2021: Enhancing Governance for Sustainability; Strengthening Science Systems; Rethinking Energy Solutions; and Resilient Food Systems, as well as a Synthesis Report which emphasized the need for 'systemic transformative changes'.

'The COVID-19 pandemic brought science to the centre of public attention and to policy-making. Researchers and scholars – from diverse fields – engaged increasingly with the public and with policy-makers. We need to build on this experience to develop more effective science–policy–society interactions and get researchers to recognize that going beyond just 'discovery' – incorporating communication and engagement with citizens and with policy-makers – is valuable and necessary.'

Heide Hackmann, speaking in an interview for *Nature Sustainability* alongside Leena Srivastava, Deputy Director General for Science at the IIASA

The project also resulted in a policy brief for the G20: *From Pathogens to people: Enhancing reporting and surveillance for more effective control of disease outbreaks*, published in September 2021, an article in *Current Research in Environmental Sustainability*, and interventions by the IIASA at the American Association for the Advancement of Science annual meeting and at the UN Food Systems Summit.

Leading Integrated Research for Agenda 2030 in Africa

2021 was the final year of the Leading Integrated Research for Agenda 2030 in Africa (LIRA 2030) programme, and was characterized by close consultation with the third and final cohort of projects funded through the programme to ensure that they finalized and reported on their activities, and to capture key outputs and outcomes.

Despite challenging circumstances, projects still managed to advance their work, publishing at least 15 peer-reviewed articles that provide context-specific knowledge and capacity development for addressing local challenges. Grantees also contributed to a number of other publications and tools, including five policy briefs. All LIRA 2030 projects are working with local communities to generate positive social impacts across different scales. One of the LIRA projects, which focuses on citizen science and air quality, significantly contributed to the development of the Air Quality Bill in Kenya.

Another project contributed to the development of a video produced by French newspaper *Le Monde* on 'Why South Africa is the most unequal country in the world'.

The programme co-organized two virtual sessions at the Sustainability Research & Innovation Congress 2021 (SRI2021), and grantees also participated in the UNAI Digital Dialogue Series focusing on Advancing the SDGs and the International Transdisciplinarity Conference 2021: Creating Spaces and Cultivating Mindsets for Learning and Experimentation, as well as several other events to which they were invited independently.

In addition, as a result of grants awarded in 2020 to foster collaboration across LIRA projects, six collaborative articles were published in 2021, with two more expected in 2022.

A final evaluation workshop was held virtually in December 2021 to assess the effectiveness of transdisciplinary research in addressing sustainability challenges. Three different virtual meetings brought together early-career African scientists involved in the programme to discuss what they had learned and showcase their achievements in advancing the 2030 Agenda in African cities.

In order to build on the experience of undertaking transdisciplinary research in different urban contexts in Africa, and to provide lessons for future transdisciplinary research projects, a learning study has been initiated and continued through 2021. Findings from the learning study have already informed three published articles, with another in press. A report will be finalized in 2022.

'The cross-project collaboration (grant) was a great experience. The grant gave us an opportunity to publish joint papers with LIRA grantees in high impact journals and opened the door to the team members to expand their network of partnerships across Africa and to cement the ground for future collaboration.'

Feedback from an early-career researcher involved in the LIRA 2030 collaborative grant scheme

The Gold Matters project, part of the Transformations to Sustainability programme, involves using photography, painting and sculpture to find ways to stimulate discussions about small-scale and artisanal gold mining. A virtual exhibition was launched in 2021, building on in-person exhibitions such as the one photographed in Kejetia, northern Ghana.

Photo: Nii Obodai

Transformations to Sustainability

After a slow-down imposed by the COVID-19 pandemic in 2020, the Transformations to Sustainability programme's twelve transdisciplinary research projects regrouped and regained momentum in 2021.

In March 2021 the programme organized a public roundtable discussion with three invited experts on the meaning of 'transformations to sustainability', available to watch online.

The projects also produced a special issue of the journal *Current Opinion in Environmental Sustainability (COSUST)*, with eleven articles focusing on the contributions of social science approaches and perspectives on transformations to sustainability. These issues were further explored in conference sessions at the Sustainability Research & Innovation Congress 2021 and Transformations 2021: Enabling positive tipping points in an uncertain world.

One of the peer-reviewed articles for *COSUST* was co-authored with the ISC Transformations to Sustainability and LIRA 2030 programme managers and presented an analysis of ways in which research networks can foster transdisciplinary science for sustainability.

The programme continued its efforts to synthesize knowledge on transformations to sustainability, producing four original peer-reviewed review articles in a long-running virtual special issue of *COSUST* (in addition to the issue mentioned above) and two knowledge briefs: *Finding common ground in transformative sustainability narratives* and *Three ways of understanding social transformations to sustainability*.

The Pathways Transformative Knowledge Network, which ran from 2016 to 2019, produced its final output, the open-access book *Transformative Pathways to Sustainability: Learning Across Disciplines, Cultures and Contexts*, which highlights the role played by transdisciplinary research in contributing to transformations to sustainability. Other outputs continued to emerge from the completed networks funded through the first phase of the programme over the course of 2021.

'I just wanted to express gratitude for the space to work in such experimental ways and to have that received as being valuable knowledge. It's a paradigm shift for me and others in terms of dreaming of what research and education can look like as we continue to encourage ourselves to work in affirmative ways towards a future worthy of our longing.'

Injairu Kulundu-Bolus
Environmental Learning Research Centre, Rhodes University South Africa

Bell's bridge in Glasgow leads towards the Scottish Event Campus, where COP26 took place

Photo: Dun Deagh / Flickr

TRANSFORM 21

As the eyes of the world looked towards Glasgow and the UN Climate Change Conference COP26, the ISC launched the Transform 21 portal in partnership with the incoming UK presidency of COP26. The platform aimed to leverage the ISC's convening power with the global scientific community and the UK COP26 presidency's access to policy-makers in order to ensure that the latest scientific evidence relevant to negotiations was made available in an easy-to-access, centralized information hub. The ISC community of affiliated bodies and members responded actively to the opportunity to share information, posting over 60 different publications as well events and original blogs to the platform.

Hazards definition and classification

Following the publication in 2020 of a report on the scope and definitions of hazards relevant to risk reduction, in 2021 the ISC and United Nations Office for Disaster Risk Reduction (UNDRR) published a report compiling definitions for over 300 hazards grouped around 8 hazard types (meteorological and hydrological, extraterrestrial, geohazards, environmental, chemical, biological, technological and societal hazards). Building on existing authoritative definitions, the report provides a resource for governments and other stakeholders to support a more comprehensive approach to hazard identification and risk reduction based on robust hazard definitions. Several ISC Members and affiliated bodies participated in this publication, as well as a number of UN organizations, with over 100 authors and 130 peer reviewers involved in the compilation of the profiles.

Watch the launch of the Hazard Definition and Classification Review online.

The report has received interest from government agencies in Australia and Sierra Leone, and was referenced in the World Health Organization (WHO) Framework for Strengthening Health Emergency Preparedness in Cities and Urban Settings. The Inter-Agency and Expert Group on Disaster-related Statistics is using the classification and hazards definitions with national statistical offices and is exploring integration in databases and reporting systems.

COVID-19 Outcome Scenarios

COVID-19 is expected to have direct and indirect consequences over the long term, affecting societal cohesion, mental health, individual and societal wellbeing, and even democracy. In early 2021 the ISC launched a new project to develop and present a range of mid- and long-term scenarios to assist understanding of the options for achieving an optimistic and fair end to the pandemic. A multidisciplinary Oversight Panel made up of globally representative high-ranking experts in relevant disciplines was established by the ISC together with WHO and UNDRR, and members of the panel announced the project via an article in *The Lancet* titled 'Future scenarios for the COVID-19 pandemic'.

The project's research and analysis were developed through a number of events held throughout the year, including at the UN High-level Political Forum and a session at the ISC General Assembly featuring speakers from UNDRR and WHO, as well as other experts from the scientific community.

Regional workshops took place through July and August 2021, bringing together individuals nominated by ISC Members and the wider scientific community to share expertise.

In November 2021, as part of the ISC-BBC StoryWorks partnership for the 'Unlocking Science' series, 'The "clocks" COVID-19 set ticking' video story related to the project was released. It has now had more audience engagement than any other video in the series.

'We need a long-term view. That's why the International Science Council's exercise [COVID-19 Scenarios Project] is so important. This virus is not going to go away.'

Peter Piot
Speaking during a side-event at the UN High-level Political Forum

The World Climate Research Programme

In 2021 the World Climate Research Programme (WCRP) completed its transition to a new structure, based on six Core Projects and five 'Lighthouse Activities'. This included the establishment of a new Core Project on Earth System Modelling and Observations (ESMO), which integrates modelling, data and observational activities across WCRP, and links to key partners, and a new Core Project on Regional Information for Society (RIfS). The Lighthouse Activities are designed to be ambitious and transdisciplinary so that they can rapidly advance some of the new science, technologies and institutional frameworks. Collectively, the activities aim to enable society to access, assess and use the very best climate data and information available in a timely manner and in innovative ways, and to ensure that this is supported by training and education.

WCRP continued to ensure that policy-makers have access to the very latest and best climate research available. Members of the WCRP community were active as authors of various chapters of the Intergovernmental Panel on Climate Change Sixth Assessment Report. WCRP was involved in a number of science events at COP26, and released a statement titled 'Emerging climate risks and what will it take to limit global warming to 2.0°C?' Together with Future Earth and the Earth League, WCRP released the '10 New Insights in Climate Science 2021'.

WCRP also considered how to better engage in the regions of the world, holding WCRP Climate Research Forums in Asia, Europe, and North, Central and South America. This will be built on in a variety of ways in the lead-up to the WCRP Open Science Conference in 2023, which will have the theme of 'Advancing Climate Science for a Sustainable Future'.

The Urban Health and Wellbeing Programme

A highlight for 2021 was a five-day online workshop on co-creating solutions to complex urban problems. The online workshop explored the health co-benefits of Haizhu Wetland Park in Guangzhou through collaborative systems modelling, and demonstrated the potential of collaborative systems modelling for improving decision-making under complexity and facilitating interconnected systems thinking. Policy recommendations were formulated, and the outcomes of the workshop have been accepted for publication in the journal *Cities & Health*.

Integrated Research on Disaster Risk

The Integrated Research on Disaster Risk's *IRDR Compilation 2010–2020: A Ten-Year Science Quest for Disaster Risk Reduction* was published in 2021, summarizing the programme's main achievements in research and action, science-policy exchange, capacity building, and challenges and opportunities for the future. The *Framework for Global Science in Support of Risk-informed and Sustainable Development and Planetary Health* was launched at the ISC General Assembly 2021. The Framework provides a compelling set of directions for research and scientific collaboration to understand and manage risks. The framework also drew on the IRDR Working Paper series, two of which were published in 2021: *Mapping Disaster Risk Reduction Institutions Using Web-based Accessible Information* and *The State of Knowledge on Disaster Risk*.

The IRDR 2021 International Conference 'Advancing Risk Science for Development Safety: 10 Years of IRDR – Building a new risk research agenda for 2030 and beyond' was held in June 2021, with 426 participants from 80 countries, and the establishment of an International Centre of Excellence (ICoE) Japan was approved by the Scientific Committee. The ICoE will further strengthen coherence between disaster risk reduction and climate change adaptation.

Future Earth

Future Earth collaborated with the ISC on reports, activities and shared communication efforts in 2021. The Sustainability Research & Innovation Congress brought together more than 2,000 participants from over 100 countries, and the *Global Risks Perceptions Report 2021*, developed with the ISC, shared findings from scientists on the likelihood and impact of 35 global risks. Future Earth contributed to the Global Forum of Funders and the resulting *Unleashing Science* report, as well as collaborating with the ISC on the Coalition for Digital Environmental Sustainability (CODES) to feed into the UN Secretary-General's *Roadmap for Digital Cooperation*. Find out more about all the highlights from Future Earth in their *2020–2021 Annual Report*.

Global Research Programme on Inequality

The Global Research Programme on Inequality (GRIP) launched a number of new materials in 2021, including a newsletter and podcast ('Unequal Worlds') with the goal of reaching a broader audience to increase awareness of rising inequalities in all forms and dimensions. GRIP also led the programme committee for the 2021 SDG Conference Bergen and organized a special session devoted to discussions on global perspectives on inequality in reformulating the SDGs. The interdisciplinary Speculative Urban Futures project was initiated by GRIP, focusing on exploring possible urban futures and inequalities. GRIP continued to examine the inequalities exacerbated by COVID-19, via the miniseries 'Inequality in the (Post)-Pandemic City' and a webinar on vaccine inequality.

The Global Ocean Observing System

The Global Ocean Observing System (GOOS) launched three ambitious programmes in 2021, under the United Nations Decade of Ocean Science for Sustainable Development, with a shared vision of a co-designed, integrated observing and forecasting system, driven by user needs and linking coastal and open ocean. Capacity building will provide more communities with access to information to guide policy, investment and sustainable development. The Ocean Observations in Areas under National Jurisdiction Workshop Report raised a red flag on the constraints scientists face when deploying ocean observation systems in countries' Exclusive Economic Zones and proposed a number of practical solutions. An extensive study of the global coverage of biological ocean observations was published by the GOOS BioEco panel and partners, identifying knowledge gaps in the global status of marine life and calling for prioritized action.

Global Climate Observing System

In 2021 the Global Climate Observing System (GCOS) released its latest report on the state of the global climate observing system, which was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) for consideration at COP26.

The report shows that satellite observations have improved since 2015, allowing near-global coverage of many variables and open access to the data. In situ observations have improved too, with new technologies and approaches being developed, especially in the oceans, and better archiving and online access to the observations and derived information.

Overall, there are four main areas that still need improvement: (a) ensuring the sustainability of observations; (b) gaps in geographical coverage; (c) ensuring permanent and unrestricted access to the observations; and (d) support of policies driven by the UNFCCC Paris Agreement.

An Implementation Plan proposing actions to improve the global climate system will be published in 2022.

The Scientific Committee on Antarctic Research featured in the multimedia article 'What Antarctica can teach us about climate change'.

Photo: BBC StoryWorks Commercial Productions

Scientific Committee on Antarctic Research

The highlight of 2021 for the Scientific Committee on Antarctic Research (SCAR) was the launch of three new Scientific Research Programmes: INStabilities and Thresholds in ANTarctica (INSTANT), Integrated Science to Inform Antarctic and Southern Ocean Conservation (Ant-ICON) and Near-term Variability and Prediction of the Antarctic Climate System (AntClim^{now}).

Other highlights include events organized by SCAR at COP26 in Glasgow and a keynote lecture at the Antarctic Parliamentarians' Assembly.

SCAR also featured in the ISC-BBC StoryWorks 'Unlocking Science' series with a dynamic article, 'What Antarctica can teach us about climate change'.

The Paris Declaration adopted at the 43rd Antarctic Treaty Consultative Meeting reinforced the value of SCAR in providing scientific advice.

Scientific Committee on Oceanic Research

The Scientific Committee on Oceanic Research (SCOR) community made remarkable progress in 2021, maintaining engagement through over 100 virtual meetings and publishing more than 160 papers.

Three new SCOR Working Groups were approved, on ocean-ice-atmosphere processes, fish visual CENSUS techniques, and mixotrophy in the oceans, and several SCOR working groups and projects were endorsed by the UN Decade of Ocean Science for Sustainable Development or are contributing to Ocean Decade-endorsed projects. On capacity development, SCOR supported fellowships and visiting scholar programmes, and co-organized the 'International Workshop on Application of Ocean Science and Technology for the Practice of Sustainable "Blue Economy" in Developing Countries' with the Centre for Science and Technology of the Non-Aligned & Other Developing Countries. SCOR also became a partner leading the International Year of Basic Sciences for Sustainable Development (IYBSSD2022). Read more about SCOR's 2021 highlights.

2 CONVERGING SCIENCE AND TECHNOLOGY IN A DIGITAL ERA

As the digital transformation continues apace, responding to the COVID-19 pandemic has demonstrated the value of digital solutions for scientific collaboration and education, supporting accelerated vaccine development and a rapid shift to remote working and learning. The potential for digital transformation to support scientific advancement, behavioural change and improvements to health and wellbeing is clear. However, widespread application of digital technologies can also exacerbate existing inequalities and deepen digital exclusion, posing urgent questions about the ethics, governance and regulation of converging technologies, and the role of the scientific community in shaping the future of digitally enabled science and technology.

Robotic-assisted surgical systems are just one of the ways in which digital technologies are transforming health care.

Photo: Nicolas Duprey/CD 78 / Flickr

Coalition for Digital Environmental Sustainability

Since its launch in March 2021 in response to the UN Secretary-General's Roadmap for Digital Cooperation, the international multi-stakeholder alliance, the Coalition for Digital Environmental Sustainability (CODES), has grown into a community of over 1,000 individuals and organizations. Members are working together to reorient and prioritize the application of digital technologies to meet the 2030 Agenda for Sustainable Development, and to achieve other global environmental goals. The ISC is a co-champion of CODES, and is jointly responsible for acting as its secretariat and coordinating the delivery of the strategic objectives and key outputs.

The draft Action Plan was presented to UN member states at the UN Environment Assembly in March 2022, and launched at the Stockholm +50 conference on 2–3 June 2022. The project's early impact and lessons learnt will be presented at the UN Summit of the Future in 2023.

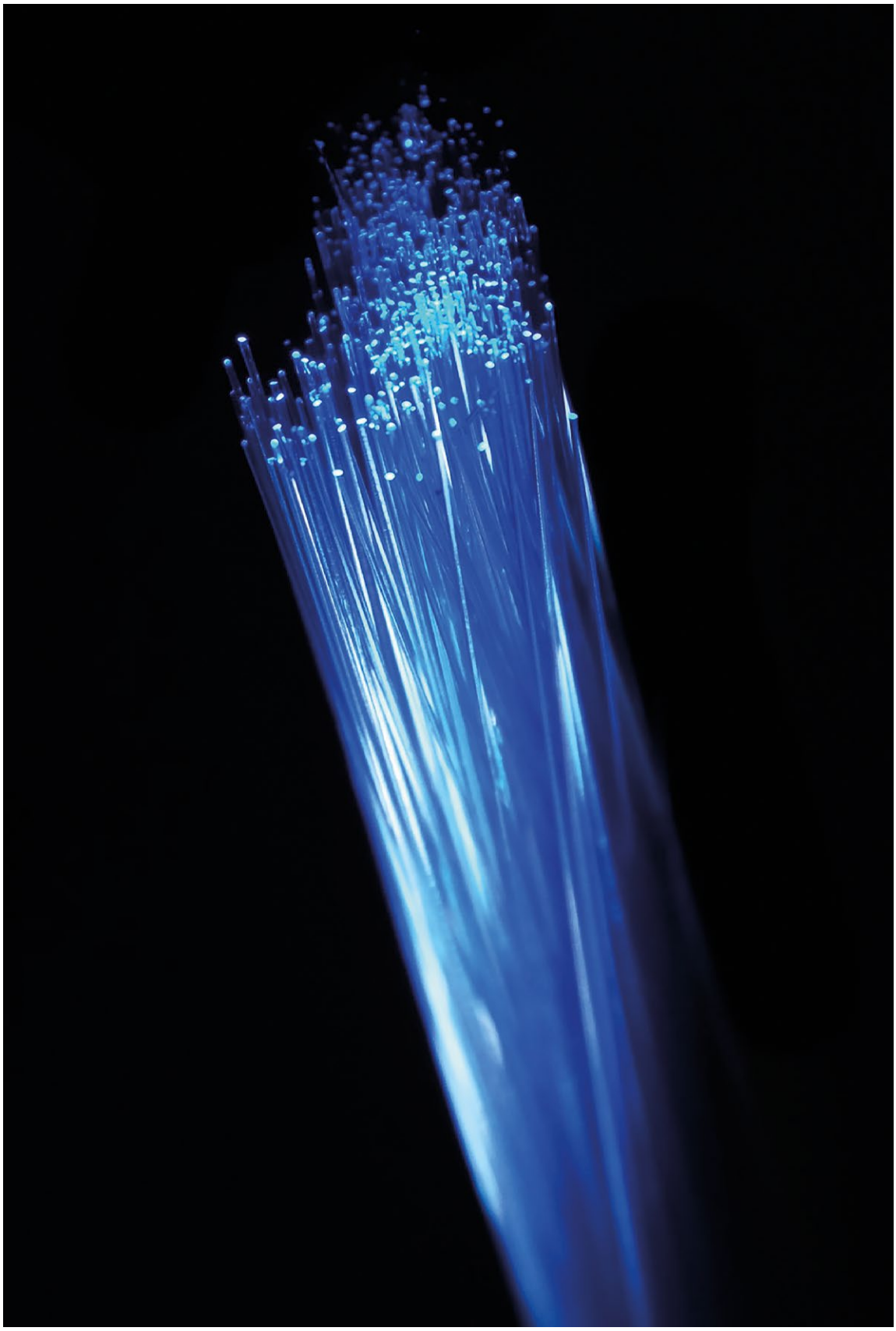
Making data work for cross-domain grand challenges

The scientific and technical basis for this project was further developed through 2021 by the Committee on Data of the ISC (CODATA). Interoperability for cross-domain data has been explored on a technical level and through case studies. This work has included partnering with ISC Members to develop key pillars of the project, and to raise awareness of, educate and enable their communities in the understanding and implementation of digital unit representation.

A task group on the Digital Representation of Units of Measurement is collaborating with the International Bureau of Weights and Measures, and is making progress on converting legacy vocabularies (that are not accessible using web standards) into FAIR (Findable, Accessible, Interoperable and Reusable) vocabularies. The paper 'Ten simple rules for making a vocabulary FAIR' resulted from a CODATA-Data Documentation Initiative (DDI) workshop, and provides a blueprint for the International Union for the Scientific Study of Population-CODATA working group on FAIR Vocabularies in Population Science.

The 2021 report 'The Role of DDI-Cross-Domain Integration (CDI) in the European Open Science Cloud (EOSC): Possible Uses and Applications' was a significant contribution to these discussions, and the case studies were further explored at CODATA's regular Dagstuhl Workshops.

Building on this work, CODATA successfully led a proposal to the European Commission for the €2 m, two-year WorldFAIR project that will continue this work, testing specifications for core interoperability with a set of eleven case studies, including one with the International Union of Pure and Applied Chemistry.



Blue light passing over fibre optic cable

Photo: Compare Fibre / Unsplash

THE ARC OF THE INTERNET: A GUEST PERSPECTIVE BY ISC PATRON AND INTERNET EVANGELIST VINTON G. CERF

Looking at the arc of the Internet's 50 year history from its Arpanet (Advanced Research Projects Agency Network) origins in 1969 to the present, certain milestones stand out. One is the transition from the 50 kb/s Arpanet system and its NCP protocols to the Internet and its TCP/IP protocol suite in 1983 after a decade of development[1]. The next major development in the mid-1980s involved three additional backbone networks sponsored by the US Department of Energy (ESNET), NASA (NASA Science Internet) and the US National Science Foundation (NSFNET) and concomitant intermediate level networks all operating at 1.5 Mb/s or more. By 1989, three commercial networks were in operation in the US: Performance Systems International (PSINET), UUNET and the California Education and Research Federation Network (CERFnet). In 1991, the World Wide Web was announced and in 1993, the MOSAIC graphical user interface browser was born. That led to the founding of Netscape Communications and its Netscape Navigator browser (and matching server) leading to a spectacular initial public offering in 1995. The 'dot-com boom' was on! Other browsers were developed such as Chrome, Internet Explorer, Edge and Firefox. Web search engines proliferated with AltaVista, Yahoo!, Google and Bing, among others. Social media companies such as Facebook, YouTube and Twitter arrived in the mid-2000s just before the dramatic debut of the Apple iPhone in 2007.

As Internet speeds have increased, streaming video has become more feasible and now, thanks in part to the COVID-19 pandemic, billions of people are holding videoconference calls daily with products like Zoom, Meet, Teams, BlueJeans, Remo and many others. These applications are facilitated by global optical fibre networks with backbone speeds of 400 Gb/s or more, 4G, 5G and Wi-Fi links operating in the tens to hundreds of megabit and even gigabit ranges. Low earth orbiting satellite systems are forming including Starlink, OneWeb and Kuiper which will bring Internet access to every square inch of planet Earth. The space agencies of the world are already standardizing the protocols for an interplanetary Internet and work is ongoing to ensure that these new technologies do not contribute to increased greenhouse gas emissions or electronic waste. The Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF), which was co-founded by the ISC, is working to ensure that these new satellite systems can co-exist with existing radio astronomy technologies.

What can we expect in the 2020s? The COVID-19 pandemic has accelerated our use of online tools that allow some of us to work from home or remotely. Online education, still evolving, got an unexpected boost during the pandemic, but demonstrated that despite successes, we have some distance to go to make remote schooling an effective experience. Among the bright lights we can count the Georgia Tech Online Master of Science in Computer Science programme, the Khan Academy, Udacity and Coursera programmes, among others. Elementary-, middle- and high-school online offerings have been harder to develop, not least because the schools are less well equipped and students more varied in their access to adequate Internet services. The COVID-Education Alliance (COVIDEA), of which the ISC is a partner, is working to ensure that lessons are learned from the pandemic that can help education institutions respond to similar challenges in the future.

[1] Better known by their respective acronyms, NCP stands for Network Control protocols, and TCP/IP Transmission Control Protocol/Internet Protocol.

Augmented reality, which superimposes knowledge on the real world, is becoming more feasible, as is virtual reality, in which almost anything is possible – the laws of physics need not apply. Machine learning has delivered speech recognition, text translation, medical diagnoses, voice-activated 'assistants' that answer questions and control appliances, chatbots, automatic captioning, self-driving cars, learning robots, and automatic warehouses and factories.

The Internet of Things is a coming tidal wave of programmable, networked devices and appliances that will populate homes, offices and manufacturing facilities. 3D printing, already a big market, will invert the normal manufacturing process by making devices local on demand rather than producing, warehousing and delivering them in traditional ways. In the history of computing, visionaries like Vannevar Bush, Douglas Engelbart and J.C.R. Licklider imagined a world in which computers became cooperating partners in discovery and development. Their dreams are slowly being realized as we learn new ways to absorb and process information of all kinds.

To show how far machine learning in text space has progressed, Google recently reported that its PaLM 540B system has the ability to explain jokes and puns:

Prompt: Explain this joke:

Joke: *Did you see that Google just hired an elephant whale for their TPU team? It showed them how to communicate between two different pods!*

Response (by PaLM 540B): *Prediction: TPUs are a type of computer chip that Google uses for deep learning. A 'pod' is a group of TPUs. A 'pod' is also a group of whales. The joke is that the whale is able to communicate between two groups of whales, but the speaker is pretending that the whale is able to communicate between two different groups of TPUs.*

It's one thing when computers can tell jokes but another when they can explain them! We are just at the beginning of a new era in which computers will become increasingly capable of communicating and working cooperatively with humans. This amplification of human capability holds enormous promise, but comes with the great risk that such powers will be put to work in ways that harm our society more than help it. We must collectively ensure that technological developments do not create existential risks. This is where the International Science Council comes in: as interlocutor and harbinger of the promise and peril of science and the fruits of its application.

Vinton G. Cerf
ISC Patron

The Committee on Data of the International Science Council (CODATA)

In addition to its work on the Decadal Programme: Making Data Work for Cross-Domain Grand Challenges [see page 24], CODATA's Executive Director, Simon Hodson, was vice-chair of the Expert Advisory Group that developed and advised on the text for the UNESCO Recommendation on Open Science that was adopted by the UNESCO General Conference in November 2021. CODATA also launched the Global Open Science Cloud initiative to encourage cooperation, alignment and interoperability among Open Science infrastructure initiatives around the world, and hosted an entirely virtual SciDataCon, filling the gap created by the postponement of International Data Week/SciDataCon to June 2022. Covering the full range of CODATA and World Data System (WDS) activities and interests, the event attracted over 1,200 online participants. Find out more in the *Overview of CODATA Activities and Achievements* report, which was presented to the CODATA General Assembly in November 2021, and in *Data to Improve our World in 2022*.

World Data System

In 2021 the Scientific Committee of the World Data System (WDS) was renewed, with 50% new members. The WDS co-sponsors appointed David Castle as Chair of the Science Committee. Meredith Goins was appointed as new Executive Director of the International Programme Office, which moved from Japan to the United States. The WDS has started multi-year funding from the US Department of Energy, and is now developing a two-year action plan (2022–2024) to align with the ISC.

Scientific Committee on Solar-Terrestrial Physics

The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) is currently conducting the scientific programme PRESTO (Predictability of Variable Solar-terrestrial Coupling), which runs from 2020 to 2024. PRESTO's goals are to identify the predictability of the variable solar-terrestrial coupling performance metrics through modelling, measurements and data analysis, and to strengthen communication between scientists and users. In 2021 SCOSTEP/PRESTO activities included four newsletters, five online seminars, support for conferences and funding for the development of solar-terrestrial physics-related databases. SCOSTEP also encourages capacity building activities in solar-terrestrial physics. In 2021 SCOSTEP organized ten capacity building online seminars; supported three international schools held in Russia, Bulgaria and Portugal; and operated the SCOSTEP visiting scholar programme. SCOSTEP also managed the translation of comic books designed to introduce solar-terrestrial physics to children into several languages.

Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF)

A major achievement for IUCAF in 2021 was the 94 GHz European Space Agency (ESA)-IUCAF Coordination Agreement.

Since 2005, NASA has operated the CloudSat radar in a broad swath of spectrum allocated to radioastronomy. CloudSat's kW beam saturates any receiver that it passes over, and – in the worst case – could burn out a receiver. Modifications to astronomy operations have been made, but unstable operation of the ageing satellite has resulted in last-moment accommodations by radio astronomy.

To prevent such situations occurring again when the ESA and the Japanese Space Agency (JAXA) launch the EarthCARE mission, which will have an even higher-power radar, IUCAF has participated in the Space Frequency Coordination Group. This effort bore fruit in April 2021 when ESA and IUCAF signed a Memorandum of Understanding whereby EarthCARE will be silenced when it passes over radio astronomy sites. IUCAF extends its thanks to ESA, JAXA and NASA for their cooperation.

Committee on Space Research

Amid travel restrictions and the rapidly changing sanitary situation, the Committee on Space Research (COSPAR) successfully transformed its biennial Scientific Assembly into a hybrid and then fully virtual event. The 'Sydney Assembly', which took place in January–February 2021, gathered over 2,000 virtual participants and 3,500 abstracts. COSPAR has made the best of alternative solutions for scientific exchange, and will seek to integrate possibilities for remote participation into its in-person events, which are slowly resuming. A second achievement was the setting up of its new panel on Social Sciences and Humanities (SSH), to better connect space and SSH communities and build awareness about current and future challenges.

3 SCIENCE IN POLICY AND PUBLIC DISCOURSE

The use of scientific evidence to inform policy decisions was a contested topic throughout 2021, as governments worldwide grappled with responding to the pandemic and dealing with the short- and long-term implications of climate change adaptation and mitigation. This exceptional moment for science policy has provided the impetus for a deep reflection on and renewed activity to strengthen the ISC's work within the science policy sphere, and to increase engagement with the different audiences for scientific content.

The Opening Ceremony for COP26.

Photo: Karwai Tang/ UK Government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Science in and for the intergovernmental system

In March 2021 an international steering group was appointed to propose a strategy for the ISC to increase its visibility and impact in the intergovernmental system and strengthen the voice of science in global policy processes.

Their resulting report sets out 13 ambitious recommendations for the ISC to play a major role in providing scientific inputs and advice to the intergovernmental system, organized around four pillars: (a) enhance the capacity within the scientific community to work at the science–policy interface; (b) connect the national, regional and global levels of governance; (c) strengthen relationships in the intergovernmental system; and (d) champion science as a global public good.

The report was endorsed by ISC Members through a General Assembly resolution recognizing the urgency for science to have greater influence on policy, the importance of developing an action-oriented strategy for the Council on the basis of the steering group's recommendations, and the offer made by the ISC to support the re-establishment of the UN Secretary-General Scientific Advisory Board.

These aims will be supported by the projects included in the ISC's 2022–2024 Action Plan, which has a strong focus on evidence-based decision-making and strengthening the science–policy–society interface.

The public value of science

Faced with concerns from the science community about increasingly prominent anti-science sentiment and the associated challenge to evidence-informed science for policy, the public value of science project is interrogating thinking on how perceptions of science inform policy, with the aim of enabling research institutions to use the findings that emerge.

Supported by an expert panel, the project has three foci: understanding, enabling and extending scientific engagement.

The Occasional *Paper Public Perceptions and Understandings of Science*, published in October 2021, takes a global perspective which aims to stimulate discussion among science academies and unions. The podcast series 'How To Talk About Science', released in late 2021, is based on a series of conversations with members of the expert panel on how research institutions address issues related to identity, distrust, uncertainty and alternative knowledge systems in their science communication.

A series of webinars called 'Talk Back Better' to be held in 2022 will address how to engage constituencies who are hesitant about or resistant to the scientific consensus.

Abeba Birhane, PhD researcher, Cognitive Science, Lero, University College Dublin

Photo: BBC StoryWorks Commercial Productions

Unlocking Science: An ISC-BBC StoryWorks partnership

Recognizing the heightened interest in scientific practice provoked by the COVID-19 pandemic and increasingly dangerous climate change, in 2021 the ISC entered a partnership with BBC StoryWorks to develop 'Unlocking Science': a multimedia hub featuring films, dynamic articles and podcasts.

The series tells diverse stories from across a range of disciplines that demonstrate the transformative power of scientific innovation and progress. Each story showcases evidence-based actions towards the Sustainable Development Goals. The research featured also demonstrates the ways in which communities engage with science and innovation to deliver transformation, from practical solutions to shaping our understanding of the problem.

Stories featured were submitted by ISC Members and Affiliate Members, as well as members of the ISC's research programmes, drawn from a pool of nearly 200 submissions from 69 different sources. A peer review group including representatives from three ISC Members also assessed the scientific content of each story before publication.

Since its launch on 9 November 2021, 'Unlocking Science' has far exceeded expectations for reach, being viewed over 70,000 times in just two months. On social media, 'Unlocking Science' has had over 9 million views during that time.

'Our sincere thanks to the BBC and ISC, for both allowing us the opportunity to be part of this incredible initiative, and the support we have received during the process. Congratulations on the launch and we look forward to future initiatives.'

Kevin Govender
Office of Astronomy for Development

International Network for Governmental Science Advice

2021 was an important year for the International Network for Governmental Science Advice (INGSA), which continued to address the visibility of evidence-to-policy mechanisms during the pandemic, using its role as a global convenor on the big issues at the intersection between science, policy and society. Rémi Quirion, Québec's Chief Scientist, became INGSA President in July, taking over from Peter Gluckman (who was then ISC President-Elect, now President), and in September INGSA convened its biggest global conference to date, INGSA2021: Build Back Wiser, which included high-level speakers from UNDRR and the United Nations Development Programme, among others. The network became a foundational partner of the International Public Policy Observatory, fast-tracking policy-relevant evidence on COVID-19 to policy-makers. In January 2021 the Southeast Asia Science Advice Network was launched as a regional chapter of INGSA, in order to structure and strengthen direct evidence-to-policy-making pathways in the Association of Southeast Asian Nations, particularly on the areas of shared regional concern within the SDGs. Other highlights from the year include an invitation from the United Nations Department of Economic and Social Affairs to provide a strategy note on science advice for the United Nations Committee of Experts on Public Administration, and the release of a science advice podcast, 'INGSA Horizons'.

NGSA President Rémi Quirion opens the INGSA 2021 conference.

Local women operating telescopes in Maan, a village in Ladakh, northern India. This project, which featured in 'Unlocking Science', was initiated by the Global Himalayan Expedition (GHE) in collaboration with the International Astronomical Union (IAU) Office of Astronomy for Development (OAD).

Photo: BBC StoryWorks Commercial Productions

4 CHANGING PRACTICES IN SCIENCE AND SCIENCE SYSTEMS

The open science movement, which has been building in recent years, reached a milestone in 2021 with the adoption of the UNESCO Recommendation on Open Science. At the same time, as responses to the COVID-19 pandemic evolved, 2021 was a moment to reflect on how different scientific disciplines – and the scientific community as a whole – had responded to COVID-19, and how the pandemic would shape topics of study and methods of working for the long term.

The Royal Danish Library. In 2021 the ISC released a series of videos by ISC Patron Ismail Serageldin on scientific publishing – and on libraries – in the past, present and future. The videos were inspired by the Council's work on the future of scientific publishing.

Photo: Michael Shannon / Unsplash

Open science

The UNESCO Recommendation on Open Science was adopted by member states in November 2021. This is an important step in promoting a global understanding of the meaning of and opportunities afforded by open science, as well the challenges that open science entails. The ISC was an active contributor to discussions on the development of the Recommendation, soliciting comments from its network of members and wider community, and building on the ideas developed in the 2020 discussion paper, *Open Science for the 21st Century*. This input from the international scientific community and their assessment of the draft text assisted UNESCO and its member states in the development of the final text of the Recommendation.

As a result of our constant and close engagement, the ISC and its members were invited to designate observers at the intergovernmental special committee meeting of technical and legal experts which took place at UNESCO Headquarters in May 2021, and to present a statement. The ISC was also invited to present a statement at UNESCO's 41st General Conference, shortly before the adoption of the resolution.

Future of scientific publishing

The future of scientific publishing project moved into a second phase of advocacy and action following the publication of the report *Opening the Record of Science: Making scholarly publishing work for science in the digital era* in February 2021. The Report sets out principles for reforming scientific publishing to better serve the needs of the scientific community, and at the 2021 General Assembly, ISC Members overwhelmingly supported a resolution endorsing eight principles for reform, and committed to work together to achieve reform.

This statement of common purpose from ISC Members has caught the attention of advocates for open science from around the world, being shared and cited widely in papers, conferences and meetings.

An expert steering group for the project was appointed in March 2021 to advise on priorities for reform and action, to assist in identifying and addressing relevant regional priorities, and to advise on how to implement change.

Through this project, the Council is deepening engagement with its members, national and international funders, universities, open science bodies, publishers and individual scientists to create a powerful and broadly based coalition for change. Priority activities include normalizing existing creative innovations, such as pre-print publication, which is very well established in certain disciplines – and was widely used to rapidly share knowledge on the COVID-19 pandemic – and is starting to gain prominence in other disciplines of the natural and social sciences, too. The ISC is also examining issues that underpin scientific publishing, such as research integrity, the subject of a 2021 Occasional paper from the project steering group, and governance models for publishing.

COVID-19 and the social sciences: webinar series

Understanding and responding to the COVID-19 pandemic has demanded thinking from across the disciplines, and will continue to shape scholarship for the foreseeable future, both as a new theme for research and as a lens through which to examine developments within and across disciplines.

The ISC has partnered with relevant ISC disciplinary members to convene a series of webinars focusing on the contribution of different social science disciplines to understanding and responding to the COVID-19 pandemic. Following an initial webinar in late 2020 on economics in the light of COVID-19, in April 2021 the ISC partnered with the International Union of Psychological Science for 'The two psychologies of the pandemic: from "fragile rationality" to "collective resilience"'. In October, the ISC partnered with the International Sociological Association for 'Researching and Understanding COVID Societies: Sociology and Beyond'.

In November, the ISC partnered with the International Political Science Association for 'Pandemic Politics: What have we learned?'

The three 2021 webinars brought together almost 600 participants (from over 1,100 registrants), and the recordings shared on YouTube have since more than doubled that audience.

'I'm very grateful for this — VERY. I wasn't free to attend the live event, but I've now watched it at my leisure.'

Andrew Colman
University of Leicester, UK, responding to the webinar 'The two psychologies of the pandemic: from "fragile rationality" to "collective resilience"'

Photo: Sam Rodriguez

5 FREEDOM AND RESPONSIBILITY IN SCIENCE

The work of the ISC Committee for Freedom and Responsibility in Science (CFRS), and of its portfolio of projects, shares as a central aim advocacy for the recognition of freedom and responsibility of science. In partnership with scientists and researchers internationally, the Committee seeks new ways to navigate science in a troubled world.

Browsing a world of technology

Photo: Maxim Hopman / Unsplash

Committee for Freedom and Responsibility in Science case report

The Committee responded to freedom and responsibility cases in Afghanistan, Argentina, Brazil, China/Hong Kong, Egypt, Fiji, France, Greece, India, Iran, Japan, Mexico, Myanmar, Nicaragua, Russia, Singapore, Turkey, UK, USA and Venezuela in 2021.

In addition, the CFRS responded to global issues, such as statements in support of scientists targeted due to their work on the COVID-19 pandemic, and on collaboration with Indigenous peoples in decision-making about research.

The Committee's mandated engagement in this area is prompted by alerts from ISC Members and the broader scientific community, and is underpinned by international human rights instruments relevant to science and scientists. Knowledge Sharing webinars were held with ISC Members to discuss concerns for scientific freedom around the world, to provide advice on the Committee's procedures for addressing threats to scientific freedom and to familiarize members with the CFRS advisory notes and position statements that were updated in 2021.

The latter cover conference and event boycotts; visas and online accessibility; and responsibilities for preventing, avoiding and mitigating harm to researchers undertaking fieldwork in risky settings.

The New Zealand government has actively supported the CFRS since 2016. This support was generously renewed in 2020 for a five-year period, with the Ministry of Business, Innovation and Employment supporting the CFRS via CFRS Special Advisor Frances Vaughan, based at Royal Society Te Apārangi, and Roger Ridley, Director Expert Advice and Practice, Royal Society Te Apārangi.

A contemporary perspective on the free and responsible practice of science in the 21st century

The Committee's flagship project came to fruition in 2021 with the launch of the commissioned paper *A contemporary perspective on the free and responsible practice of science in the 21st century*, which was published in December 2021. The paper reviews scientific freedom and responsibility today, and makes recommendations to guide the free and responsible practice of science in contemporary society. It proposes actions for scientists, research institutes and universities, science organizations, the private sector and governments to help strengthen free and responsible science as a force for good. The paper, which was developed by a Writing Group of scientists appointed by the Committee, with oversight from the Governing Board, has been positively received and with numerous requests for presentation at high-level fora.

A summary is being made available in six languages.

'The paper couldn't have come out at a more opportune time, considering all of the challenges that we face today.'

Patricia Evers
Deputy Director of the Committee on Human Rights of the United States National Academy of Sciences

'We shared the recent ISC publication on the right to science as pre-reading for the AAAS Committee on Scientific Freedom and Responsibility meeting last week, and several members commented on how valuable they found it.'

Nate Weisenberg
American Association for the Advancement of Science (AAAS)

Photo: 'Spectators' by Toyin Loye

Science in Exile

The ISC worked together with The World Academy of Sciences and the InterAcademy Partnership to launch Science in Exile in 2021. The programme brings together refugee, displaced and at-risk scientists and existing organizations that provide assistance to affected scientists. The aim is to exchange ideas and best practices, to identify gaps in building practical support programmes across different world regions, and to raise awareness of the issues facing displaced scientists among governments, international agencies and the broader scientific community.

ISC-led contributions to the project include a joint ISC-InterAcademy Partnership statement urging 'Action for Afghan scientists and Scholars', a webinar, Return of scientific personnel and reconstruction of infrastructure (October 2021), the development and facilitation of a panel as part of the Sustainability Research & Innovation Congress 2021 on Scientists in Exile – A meta-view of the impact of ongoing uncertainty and risks for scientists and the production of science (Forum), and a six-part podcast series on the theme of 'Science in Exile'.

The podcasts feature interviews with refugee and displaced scientists who share their science, their stories of displacement and their hopes for the future.

The quality of the ISC 'Science in Exile' podcast series was recognized by the UN Refugee Agency, which included the podcast as part of the virtual showcase for their December 2021 High-Level Officials' Meeting for the Global Compact on Refugees.

The Science in Exile Declaration was launched in April 2022. Find out how to sign here.

Podcast series: Science diversified

In recent years, instances of gender and racial discrimination have hit the headlines worldwide, including within science systems. The persistent barriers to equal participation in science cannot be ignored.

As part of the ISC's work to promote equal access to science and to combat discrimination, the ISC worked with *Nature*'s 'Working Scientist' podcast to launch a series of six podcasts on the theme of diversity in science in early 2021.

Featuring voices from ISC Members and from funded programmes of the ISC and affiliated bodies, the podcast series started from fundamental questions of why diversity makes for better science, and went on to explore how to integrate diverse voices and different perspectives in research. Over a period of six weeks, the series featured conversations that were inspirational, challenging and disquieting in equal measure, but always thought-provoking.

Speakers shared their science, and their experiences of effective action to promote inclusion of less well represented and marginalized groups, including women, people of colour, LGBTQI people, people with disabilities, and people who take a non-traditional route into science. The aim was to provide inspiration and practical ideas for how to improve diversity in science workplaces, so that organizations like the ISC can be 'better allies for better science'.

The six-part series was launched on 10 February 2021, and has been listened to over 20,000 times since.

Gender equality in science: Inclusion and participation of women in global science organizations

The findings of the collaboration between the ISC, GenderInSITE (Gender in Science, Innovation, Technology and Engineering) and the InterAcademy Partnership were published in 2021. The report challenges our complacency with the rate and degree of progress towards gender equity within science and scientific organizations, and sets an agenda for priority action.

The report calls for the establishment of a coalition on gender equality in global science to ensure a transformative action agenda. The report's findings have been well received and reported upon within the scientific community, and serve as a baseline for advocacy and policy recommendations, and for further research tracking the state of gender equity in science. Working in partnership with the project partners, the ISC will convene meetings in 2022 to explore future joint activities.

'It is important to have gender-disaggregated data to measure the extent of progress. But we must also use these metrics to spur action. We are pleased to be included in this partnership and encouraged by the expectation expressed in this collaboration that together we can move toward more gender equity in global science.'

Shirley Malcom
GenderInSITE Co-chair

6 GENERAL ASSEMBLY

One of the milestones of our year was the General Assembly held in October, the second ever such meeting held by the Council. Originally planned as an in-person event in Muscat, hosted by The Research Council Oman and the Ministry of Higher Education, Research & Innovation of the Sultanate of Oman, in the context of the ongoing COVID-19 pandemic the General Assembly was shifted to a fully online format, with interactive sessions, online voting and networking, live music and a virtual exhibition.

Immediately preceding the General Assembly, a Members' Forum brought together scientific Unions, Associations and other Members of the ISC to discuss their most pressing issues and the long-term perspective for membership engagement, particularly around advancing equality in science and working to achieve the SDGs.

Over 500 member representatives and other guests joined online during the five days of the General Assembly.

Preceding the General Assembly in October 2021, an Electronic General Assembly (eGA) held in February brought together the ISC membership to elect the 2021 Elections Committee and adopt several changes to the ISC Statutes and Rules of Procedure.

'I found it all absorbing – the formal business sections, panel discussions, reports on the major projects.'

'The exhibition space for the ISC's Affiliated Bodies was good and informative detail in the virtual GA.'

'Would have liked to visit [the exhibition space] but too busy.'

'It was difficult online but the music performance was great.'

'I have appreciated all sessions and was particularly interested in the discussions on Open Science and the dues structure.'

Anonymous feedback from Member representatives.

Resolutions adopted in October 2021

Immediately following the General Assembly, ISC Members overwhelmingly adopted a resolution on acting upon the recommendations of the 'Draft Report on the ISC Strategy in the Intergovernmental System'. This resolution calls upon the new Governing Board to respond to the Steering Group's recommendations through the development of an action-oriented strategy that fully mobilizes the scientific and policy expertise of ISC Members, partners and broader international networks.

Secondly, ISC Members adopted a resolution on endorsing eight principles for reform of scientific publishing and committing to work together to achieve reform.

FIRST EDITION OF THE ISC AWARDS PROGRAMME

The 2nd ISC General Assembly was also notable for the first edition of the ISC Awards Programme, which was established by the Governing Board to recognize individuals, groups and initiatives that serve to advance science as a global public good.

The awards will be conferred every three years during the General Assembly, with ten categories recognizing, for example, international, interdisciplinary scientific research cooperation; innovation in education, outreach and public engagement; and excellence in promoting the free and responsible practice of science.

Meet the 2021 awardees and watch the ceremony.

The first ISC Awards were conferred during the 2nd ISC General Assembly

(Photos courtesy of award winners)

Special events

Day three of the 2021 General Assembly included three virtual events open to all and available to watch online.

In the first event, the ISC presented the high-level findings of the COVID-19 Outcomes Scenarios Exercise that is being conducted in partnership with the UNDRR and the World Health Organization. The discussion focused on the importance of systems thinking and global cooperation to improve long-term outcomes of global emergencies, and took place in the framework of the International Day for Disaster Risk Reduction.

The second event brought together ISC Patrons Mary Robinson, Ismail Serageldin and Vint Cerf to discuss public perceptions of science, exploring how the ISC and its members could strengthen public engagement with science.

'The public day of the General Assembly was inspiring, and I recommend including it in the future.'

Anonymous comment from ISC Member attending the General Assembly.

Governing Board

The General Assembly elected a new Governing Board for the Council until 2024:

Peter Gluckman
President

Motoko Kotani
President-elect

Sawako Shirahase
Vice-President for Finance

Anne Husebekk
Vice-President for Freedom and Responsibility in Science

Salim Abdool Karim
Vice-President for Outreach and Engagement

Karina Batthyány

Françoise Baylis

Geoffrey Boulton

Melody Burkins

Mei-Hung Chiu

Pamela Matson

Helena Nader

Walter Oyawa

Maria Paradiso

Martin Visbeck

Mathieu Denis
(Ex-Officio)

Action plan

The ISC's inaugural Action Plan, *Advancing Science as a Global Public Good*, reached the end of its cycle in 2021, and the Council began a consultation process with members to develop a new framework for the ISC's work until the end of 2024.

A writing team including board members Geoffrey Boulton, Pearl Dykstra, Daya Reddy and inaugural CEO Heide Hackmann produced the draft plan, building on the existing structure of the Council's four domains of work and adding a fifth. The five domains are:

1. Global Sustainability
2. Converging Science and Technology in a Digital Era
3. Science in Policy and Public Discourse
4. Changing Practices in Science and Science Systems
5. Freedom and Responsibility in Science

As part of the consultation process, 60 participants from the ISC membership and its affiliated bodies took part in online dialogues to share their views on the development of the Plan, and a further 21 members responded to the online portal with comments and suggestions. Ninety per cent of respondents said that the new Action Plan responded appropriately to the ISC's vision and mission.

During the consultation, members raised issues around university-level education in scientific disciplines, the public value of science and the effects of misinformation, and mechanisms for ISC Members to be involved in the Council's projects. Scientific unions stressed their keenness to pursue collaborative and funded programmes that respond to today's challenges.

'Congratulations for this new plan.'

Orhan Altan
International Society for Photogrammetry and Remote Sensing

'I want to congratulate it because this is very strong plan, it is really remarkable how the ISC is now a global voice for science.'

Karina Batthyány
Latin American Council of Social Sciences

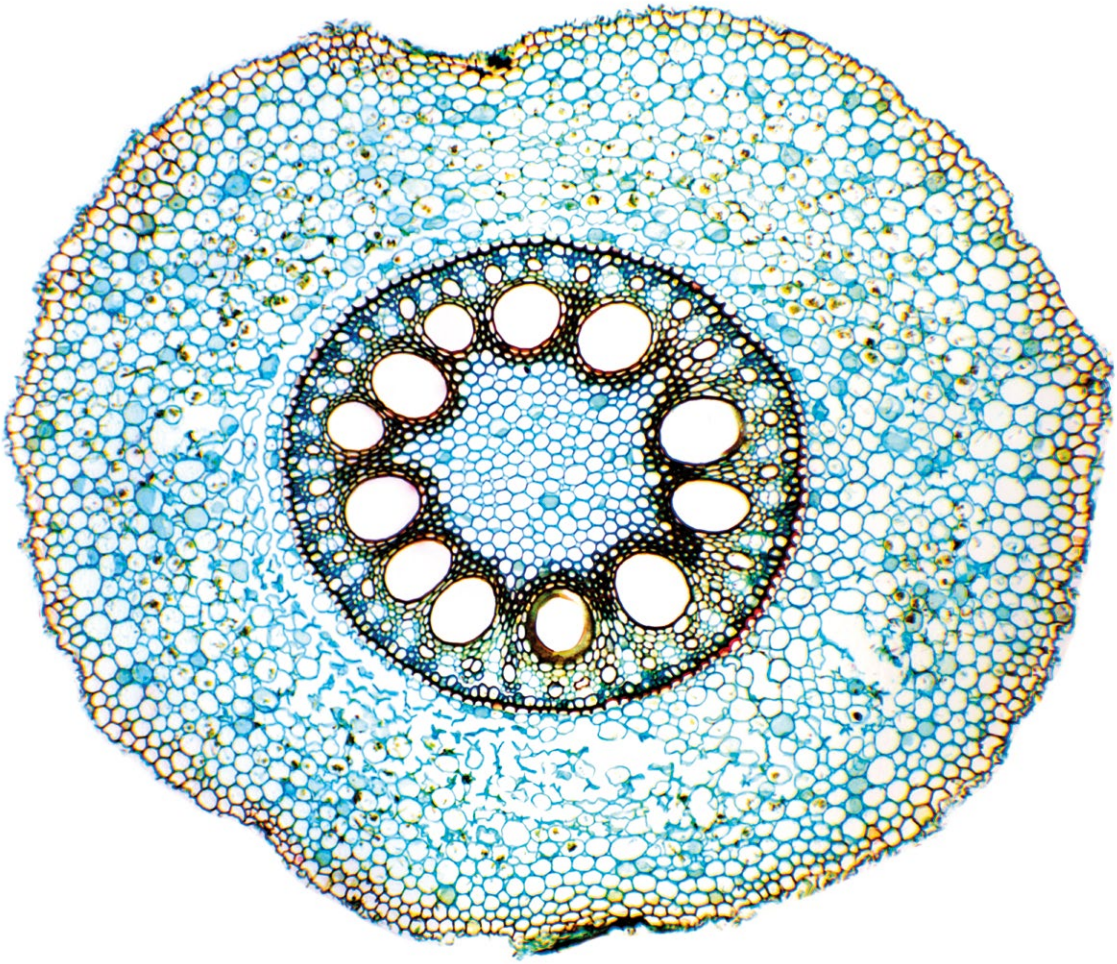
Through this review process, the Council responded and committed to establishing effective pathways for members to be more directly and actively involved in the Council's scientific activities. One such activity would be to solicit members' ideas for new international activities on an annual basis, for which the board could allocate up to €100,000 per annum for projects that supported the five domains.

The new Action Plan 2022–2024, 'Science and Society in Transition' was launched in September 2021.

The new plan, with 27 scientific projects and activities led in collaboration with 70 partners, provides for the establishment of an ISC fellowship, the establishment of regional focal points and a priority focus on fundraising in order to position the ISC as the recognized global voice for science.

'The ISC's second Action Plan is published at an important inflection point for the Council and for science and its relationship to wider society. The inaugural Governing Board under the leadership of Daya Reddy left the ISC in a very good position to accelerate its impact and profile. Board members, the CEO and the ISC Secretariat must be enthusiastically acknowledged for what they have achieved in the first three years since the Council's establishment.'

Peter Gluckman
ISC President



Maize root light micrograph , from the cover of the Action Plan.

Photo: Dr Keith Wheeler / Science Photo Library

7 OPERATIONS AND FINANCE

In its first three years of operation, the ISC Governing Board and Secretariat worked towards operationalizing the ISC's ambitious new vision and mission through a strengthened regional presence, the appointment of ISC Patrons and the establishment of a solid financial footing for the Council.

Regional transition

The vision for a continued regional presence for the ISC is one of a single, global ISC secretariat, with headquarters (HQ) in Paris and regional structures located in different parts of the world that are directly accountable to the HQ. The new regional focal points will build on the valuable experiences and support networks of the three former regional offices in Africa, Asia and the Pacific, and Latin America and the Caribbean.

The first three years of the Council's operation have been a period of transition for the former Regional Offices. Following a decision of the government of El Salvador, the Regional Office for Latin America and the Caribbean closed in December 2019. The hosting arrangements provided by the South African Department of Science and Innovation and the Academy of Science of South Africa for the Regional Office in Africa, and by the Academy of Sciences Malaysia for the Regional Office in the Asia-Pacific region, were concluded in 2021.

The ISC Governing Board and headquarters, as well as the entire ISC community, are extremely grateful for the support provided by the respective members and organizations to maintain the regional offices over the years, and thank the regional office staff for their valuable work and crucial commitment to advancing science as a global public good in the respective regions.

Planning is now in place for the transition to new regional focal points following an open call for expressions of interest to host a regional presence in each of the three regions. In December 2021 the ISC signed an agreement with the Colombian Academy of Exact, Physical and Natural Sciences to host a Regional Focal Point for Latin America and the Caribbean during the 2022–2024 term. The arrangements for an ISC regional presence in Asia-Pacific and Africa are under development.

The ISC Regional Focal Point for Latin America and the Caribbean is now hosted at the Colombian Academy of Exact, Physical and Natural Sciences in Bogotá, Colombia.

Photo: Social Impact

ISC Patrons

The ISC's Patrons Mary Robinson, Ismail Serageldin and Vint Cerf continued to support the Council throughout 2021. A highlight was their joint session at the General Assembly on 'Unlocking Science: Should we do better on public engagement?'

The open public session explored how levels of public trust in science remain relatively high in the context of an increasingly fragmented and polarized political and media environment, and what the root causes of this polarization and fragmentation mean for science.

The Patrons explored the importance of not assuming that all audiences were alike, and the risk that fringe ideas could be amplified through advances in technological communication.

Vint Cerf argued that spending time and energy refuting fringe ideas takes communities away from helping people understand what the real facts are.

Ismail Serageldin cautioned that societies needed more than just knowledge; they needed wisdom and the ability to pull people together so that science could advance solutions in times of great challenges to humanity.

Mary Robinson described the gravity of so-called 'alternative facts' and their effects on democracy, citing a real dysfunction in the system affecting the possibility of holding dialogues in the civil space. She also proposed the three key messages for engaging communities on the existential threat of climate change, with a specific challenge to the science community to:

1. *Take the climate change emergency seriously in your personal lives, to make a commitment to doing something you weren't doing yesterday;*
2. *Get angry with those who are not taking steps – business, governments and, particularly, the fossil fuel industry; and*
3. *Imagine and visualize the future that we are rapidly approaching and do more to express this through storytelling.*

The Patrons discussed the need for a new framework to promote a multi-dimensional dialogue led by champions at all levels of society.

'The Patrons' discussion was very useful. At a time of uncertainties, it is good to hear from those who were pioneering and influential in major science developments.'

Anonymous comment from ISC Member attending the General Assembly.

Financial reporting

An independent audit of the ISC's finances in 2021 pointed to a healthy financial outlook, as well as the Council's excellent conformity with French legal standards for financial reporting. The COVID-19 pandemic resulted in lower than expected expenditure on governance functions in 2021, as statutory meetings and meetings of project steering groups moved online, and communications expenses were also lower than expected. The continuation of the pandemic continues to create uncertainty for the ISC and for many of its members, and a fundraising strategy is being developed to provide additional support for the ISC's future activities in the coming years.

Assets and liabilities

BALANCE SHEET

International Science Council (ISC) for the period 1 January to 31 December 2021

ASSETS	EUROS
Bank & cash balances	3,732,262
Marketable securities	2,446,074
Other assets	59,409
Fixed assets	60,710
Total assets	**6,298,455**

LIABILITIES	EUROS
External funds allocated	1,801,020
Sundry creditors & accruals	742,670
Provision/Retirement	204,536
Total liabilities	**2,748,226**

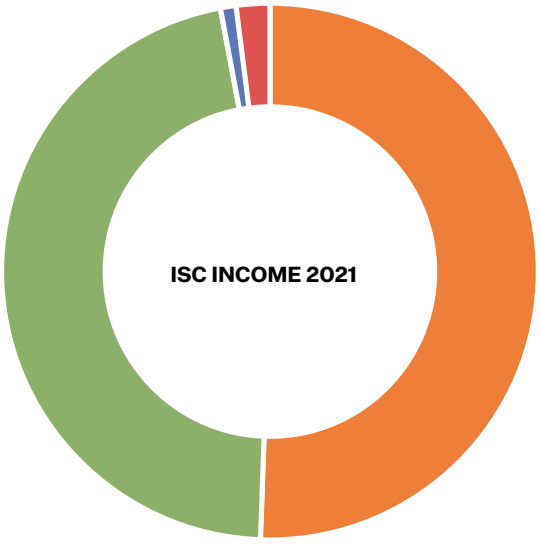
RESERVES	EUROS
Mandatory reserve	1,500,000
General fund/Retained earnings	1,998,021
Total reserves	**3,498,021**
Net result	**52,208**

STATEMENT OF INCOME AND EXPENDITURE

International Science Council (ISC) for the period 1 January to 31 December 2021

INCOME	EUROS
Membership dues	2 953 450
Earmarked funds	2 711 906
Other income	43 714
ISC Sustainable Investment Portfolio	122 423
Total income	**5 831 493**

EXPENDITURE	EUROS
Governance	67 577
Science activities	1 078 510
Dedicated funds to support the ISC activities (carry over from 2021 to be used in 2022)	1 801 020
Communications: Corporate communications, Branding, Publications, Outreach activities…	66 402
Support	2 765 776
Total expenditure	**5 779 285**



ISC MEMBERS

At the end of 2021, the ISC had 40 Full Members in Category 1 (international scientific Unions and Associations), 142 Full Members in Category 2 (academies of sciences, research councils or analogous not-for-profit scientific bodies representing a broad spectrum of scientific fields or disciplines in a country, region, territory or globally) and 42 Members in Category 3 (Affiliated Members).

A

African Academy of Sciences (AAS)

Albania, Academy of Sciences of Albania (ASA)

Angola, Foundation of Science and Development

Arab Council for the Social Sciences (ACSS)

Argentina, National Scientific and Technological Research Council (CONICET)

Armenia, National Academy of Sciences of the Republic of Armenia (NAS RA)

Association of Academies and Societies of Sciences in Asia (AASSA)

Association of Asian Social Science Research Councils (AASSREC)

Association of Science and Technology Centers (ASTC)

Australia, Academy of the Social Sciences in Australia (ASSA)

Australia, Australian Academy of Science (AAS)

Austria, Austrian Academy of Sciences (ÖAW)

Azerbaijan, Azerbaijan National Academy of Sciences (ANAS)

B

Bangladesh, Bangladesh Academy of Sciences (BAS)

Barcelona Science and Technology Diplomacy Hub (SciTech DiploHub)

Belarus, National Academy of Sciences (NASB)

Belgium, Royal Academies for Science and the Arts of Belgium (RASAB)

Benin, National Academy of Sciences, Arts and Letters (ANSALB)

Bolivia, National Academy of Sciences of Bolivia (ANCB)

Bosnia & Herzegovina, Academy of Sciences and Arts of Bosnia and Herzegovina (ANUBiH)

Bosnia & Herzegovina, Academy of Sciences and Arts of the Republic of Srpska (ANURS)

Botswana, Ministry of Infrastructure Science and Technology

Brazil, Brazilian Academy of Sciences (ABC)

Brazil, National Association of Graduate Studies and Research in Social Sciences (ANPOCS)

Bulgaria, Bulgarian Academy of Sciences (BAS)

Burkina Faso, National Center for Scientific and Technological Research (CNRST)

C

Cameroon, Cameroon Academy of Sciences (CAS)

Canada, National Research Council of Canada (NRC)

Canada, Social Science and Humanities Research Council of Canada (SSHRC)

Caribbean, Caribbean Academy of Sciences (CAS)

Chile, Chilean Academy of Sciences

China, Academy of Sciences located in Taipei

China, Association for Science and Technology (CAST)

China, Chinese Academy of Social Sciences (CASS)

Colombia, Colombian Academy of Exact, Physical and Natural Sciences (ACCEFYN)

Consortium of Humanities Centers and Institutes (CHCI)

Costa Rica, National Academy of Sciences

Côte d'Ivoire, Academy of Sciences, Arts, African Cultures and Diasporas (ASCAD)

Council for the Development of Social Science Research in Africa (CODESRIA)

Cuba, Academy of Sciences

Czech Republic, Czech Academy of Sciences

D

Denmark, Royal Danish Academy of Sciences and Letters

Dominican Republic, Academy of Sciences of the Dominican Republic

E

Egypt, Academy of Scientific Research and Technology (ASRT)

El Salvador, Viceministerio de Ciencia y Tecnología de El Salvador

Estonia, Estonian Academy of Sciences

Eswatini, National Research Council

European Association of Development and Training Institutes (EADI)

European Consortium for Political Research (ECPR)

F

Facultad Latinoamericana de Ciencias Sociales (FLACSO)

Finland, Council of Finnish Academies

France, Académie des Sciences

G

Georgia, Georgian Academy of Science

Germany, Deutsche Forschungsgemeinschaft (DFG)

Ghana, Ghana Academy of Arts & Sciences

Global Young Academy (GYA)

Greece, Academy of Athens

Guatemala, Academia de Ciencias Médicas, Fisicas y Naturales

H

Honduras, National Academy of Sciences of Honduras

Hungary, Eötvös Loránd Research Network (ELKH)

Hungary, Hungarian Academy of Sciences

I

India, Indian Council of Social Science Research (ICSSR)

India, Indian National Science Academy (INSA)

Indonesia, National Research and Innovation Agency Badan Riset dan Inovasi Nasional (BRIN)

Institute for Global Environmental Strategies (IGES)

International Arctic Science Committee (IASC)

International Arctic Social Sciences Association (IASSA)

International Association for Hydro-Environment Engineering and Research (IAHR)

International Association of Applied Psychology (IAAP)

International Association of Legal Science (IALS)

International Astronomical Union (IAU)

International Cartographic Association (ICA)

International Commission for Acoustics (ICA)

International Commission for Optics (ICO)

International Commission on Illumination (CIE)

International Council for Industrial and Applied Mathematics (ICIAM)

International Council for Laboratory Animal Science (ICLAS)

International Council for Scientific and Technical Information (ICSTI)

International Economic Association (IEA)

International Federation for Information Processing (IFIP)

International Federation of Data Organization (IFDO)

International Federation of Library Associations and Institutions (IFLA)

International Federation of Societies for Microscopy (IFSM)

International Federation of Surveyors (FIG)

International Foundation for Science (IFS)

International Geographical Union (IGU)

International Institute for Applied Systems Analysis (IIASA)

International Mathematical Union (IMU)

International Network for Advancing Science and Policy (INASP)

International Peace Research Association (IPRA)

International Political Science Association (IPSA)

International Society for Digital Earth (ISDE)

International Society for Ecological Economics (ISEE)

International Society for Photogrammetry and Remote Sensing (ISPRS)

International Society for Porous Media (InterPore)

International Sociological Association (ISA)

International Statistical Institute (ISI)

International Studies Association (ISA)

International Union for History and Philosophy of Science and Technology (IUHPST)

International Union for Physical and Engineering Sciences in Medicine (IUPESM)

International Union for Pure and Applied Biophysics (IUPAB)

International Union for Quaternary Research (INQUA)

International Union for the Scientific Study of Population (IUSSP)

International Union for Vacuum Science, Technique and Applications (IUVSTA)

International Union of Academies (UAI)

International Union of Basic and Clinical Pharmacology (IUPHAR)

International Union of Biochemistry and Molecular Biology (IUBMB)

International Union of Biological Sciences (IUBS)

International Union of Crystallography (IUCr)

International Union of Food Science and Technology (IUFoST)

International Union of Forest Research Organizations (IUFRO)

International Union of Geodesy and Geophysics (IUGG)

International Union of Geological Sciences (IUGS)

International Union of Immunological Societies (IUIS)

International Union of Materials Research Societies (IUMRS)

International Union of Microbiological Societies (IUMS)

International Union of Nutritional Sciences (IUNS)

International Union of Physiological Sciences (IUPS)

International Union of Psychological Science (IUPsyS)

International Union of Pure and Applied Chemistry (IUPAC)

International Union of Pure and Applied Physics (IUPAP)

International Union of Radio Science (URSI)

International Union of Soil Sciences (IUSS)

International Union of Speleology (UIS)

International Union of Theoretical and Applied Mechanics (IUTAM)

International Union of Toxicology (IUTOX)

International Water Association (IWA)

Iran, Islamic Rep. Of, University of Tehran

Iraq, Ministry of Science and Technology

Ireland, Royal Irish Academy

Islamic World Academy of Sciences (IAS)

Israel, Israel Academy of Sciences and Humanities

Italy, Consiglio Nazionale delle Ricerche (CNR)

J

Jamaica, Scientific Research Council

Japan, Science Council of Japan

Jordan, Royal Scientific Society

K

Kazakhstan, National Academy of Sciences of the Republic of Kazakhstan (NAS RK)

Kenya, Kenya National Academy of Sciences

Korea Democratic People's Republic of, State Academy of Sciences

Korea Republic of, Korean Social Science Research Council (KOSSREC)

Korea Republic of, National Academy of Sciences of the Republic of Korea (NAS)

Korea Republic of, Korean Academy of Science and Technology (KAST)

L

Lao PDR, Lao National Science Council

Latin American Council of Social Sciences (CLACSO)

Latvia, Latvian Academy of Sciences

Lebanon, National Council for Scientific Research (CNRS-L)

Lesotho, Department of Science and Technology

Lithuania, Lithuanian Academy of Sciences

Luxembourg, Fonds National de la Recherche (FNR)

M

Madagascar, Ministère de l'Enseignement Supérieur et de la Recherche Scientifique

Malawi, National Commission for Science and Technology

Malaysia, Academy of Sciences Malaysia

Marie Curie Alumni Association (MCAA)

Mauritius, Mauritius Academy of Science (MAST)

Mexico, Academia Mexicana de Ciencias

Mexico, Consejo Mexicano de Ciencias Sociales (COMECSO)

Moldova, Academy of Sciences of Moldova

Monaco, Principauté de, Centre Scientifique de Monaco

Mongolia, Mongolian Academy of Sciences

Montenegro, Montenegrin Academy of Sciences and Arts

Morocco, Hassan II Academy of Sciences and Technology

Mozambique, Scientific Research Association of Mozambique (AICIMO)

N

Namibia, National Commission on Research, Science and Technology (NCRST)

Nepal, Nepal Academy of Science and Technology (NAST)

Netherlands, Koninklijke Nederlandse Akademie van Wetenschappen

New Zealand, Royal Society Te Apārangi

Nigeria, Nigerian Academy of Science

North Macedonia, Macedonian Academy of Sciences and Arts

Norway, Norwegian Academy of Sciences and Letters

Norway, University of Bergen, UiB

O

Oman, Ministry of Higher Education, Research and Innovation

Organization for Social Science Research in Eastern and Southern Africa (OSSREA)

Organization for Women in Science for the Developing World (OWSD)

P

Pacific Science Association (PSA)

Pakistan, Pakistan Association for the Advancement of Science (PAAS)

Panama, Universidad de Panama

Peru, Academia Nacional de Ciencias

Philippines, National Research Council of the Philippines (NRCP)

Philippines, Philippine Social Science Council (PSSC)

Poland, Polish Academy of Sciences

Portugal, Academia das Ciencias de Lisboa

R

Romania, Academia Româna

Russian Federation, Russian Academy of Sciences (RAS)

Rwanda, Kigali Institute of Science and Technology (KIST)

S

Saudi Arabia Kingdom of, King Abdulaziz City for Science and Technology (KACST)

Scientific Committee of Problems of the Environment (SCOPE)

Senegal, Senegal Academy of Science and Technology (ANSTS)

Serbia, Serbian Academy of Sciences and Arts

Seychelles, Seychelles National Parks Authority

Singapore, Singapore National Academy of Science (SNAS)

Slovak Republic, Slovak Academy of Sciences (SAS)

Slovenia, Slovenian Academy of Sciences and Arts (SASA)

Social Science Research Council (SSRC)

Society for Social Studies of Science (4S)

Society for the Advancement of Science in Africa (SASA)

Somalia, Somali Natural Resources Research Center (SONRREC)

South Africa, Human Sciences Research Council of South Africa (HSRC)

South Africa, National Research Foundation (NRF)

South Pacific, University of the South Pacific

Spain, Ministry for Science and Innovation (MCIN)

Sri Lanka, National Science Foundation (NSF)

Sudan, National Centre for Research (NCR)

Sweden, Royal Swedish Academy of Sciences

Switzerland, Swiss Academy of Humanities and Social Sciences (SAHS)

Switzerland, Swiss Academy of Sciences

T

Tajikistan, Academy of Sciences of the Republic of Tajikistan

Tanzania, Tanzania Commission for Science and Technology

Thailand, National Research Council of Thailand

The University of the Arctic (UArctic)

The World Academy of Sciences (TWAS)

Togo, Chancellerie des Universités du Togo

Transnational Institute (TNI)

Tunisia, Université Tunis El Manar

Turkey, Science Academy – Bilim Akademisi

Turkey, Scientific and Technical Research Council of Turkey (TÜBITAK)

Turkey, Turkish Academy of Sciences (TÜBA)

U

Uganda, Uganda National Council for Science and Technology (UNCST)

Ukraine, National Academy of Sciences (NAS)

United Kingdom, British Academy

United Kingdom, Economic and Social Research Council (ESRC)

United Kingdom, Royal Society

United States, National Academy of Sciences (NAS)

Uruguay, Comisión Consejo Nacional de Innovacion Ciencia y Tecnologia (CONICYT)

Uzbekistan, Academy of Sciences of the Republic of Uzbekistan

V

Vatican City State, Pontifical Academy of Sciences

Venezuela, Fondo Nacional de Ciencia, Tecnología e Innovación (FONACIT)

Vietnam, Vietnam Union of Science and Technology Associations (VUSTA)

W

World Anthropological Union (WAU)

World Association for Public Opinion Research (WAPOR)

Z

Zambia, Zambia Academy of Sciences

Zimbabwe, Research Council of Zimbabwe (RCZ)

2021 PUBLICATIONS

Barber, M. 2021. *Strengthening Research Integrity: The role and responsibilities of publishing*. International Science Council, Paris, France.

Boulton, G.S. 2021. *Science as a Global Public Good: International Science Council Position Paper*. International Science Council, Paris, France.

Future Earth, Sustainability in the Digital Age, and International Science Council. 2021. *Global Risks Perceptions Report 2021*. Future Earth Canada Hub.

Gastrow, M. and Ishmael-Perkins, N. 2021. *Public perceptions and understandings of science: From international contexts to institutional responses*. International Science Council, Paris, France.

GenderInSITE, InterAcademy Partnership, and International Science Council. 2021. *Gender Equality in Science: Inclusion and Participation of Women in Global Science Organizations. Results of two global surveys*. International Science Council, Paris, France.

Marton-Lefèvre, J., Aricò, S., Dykstra, P., Echeverria, R.G., Fu, X., Gluckman, P., Ivanova, M., Jarraud, M., Lenton, R., Mangalagiu, D., da Silva, M.R., and Wakhungu, H.E.J. 2021. *Final report of the Steering Group advising the ISC on its strategy in the intergovernmental system*. International Science Council, Paris, France.

Murray, V., Abrahams, J., Abdallah, C., Ahmed, K., Angeles, L., Benouar, D., Brenes Torres, A., Chang Hun, C., Cox, S., Douris, J., Fagan, L., Fra Paleo, U., Han, Q., Handmer, J., Hodson, S., Khim, W., Mayner, L., Moody, N., Moraes, L.L., … Wright, N. 2021. *Hazard Information Profiles: Supplement to UNDRR-ISC Hazard Definition & Classification Review: Technical Report*. Geneva, Switzerland, United Nations Office for Disaster Risk Reduction; Paris, France, International Science Council. DOI: 10.24948/2021.05.

International Science Council. 2021. *A contemporary perspective on the free and responsible practice of science in the 21st century*. International Science Council, Paris, France.

International Science Council. 2021. *Science and society in transition – ISC Action Plan: 2022–2024*. International Science Council, Paris, France.

International Science Council. 2021. *Activity and Achievement Report: July 2018 – June 2021*. International Science Council, Paris, France.

International Science Council. 2021. *Unleashing Science: Delivering Missions for Sustainability*. International Science Council, Paris, France.

International Science Council. 2021. *Annual Report 2020*. International Science Council, Paris, France.

International Science Council. 2021. *Scientific and Technological Community Major Group position paper for the 2021 High-level Political Forum*. International Science Council, Paris, France.

International Science Council. 2021. *Finding common ground in transformative sustainability narratives: A Transformations to Sustainability Knowledge Brief*. International Science Council, Paris, France.

International Science Council. 2021. *Three ways of understanding social transformations to sustainability: A Transformations to Sustainability Knowledge Brief*. International Science Council, Paris, France.

International Science Council. 2021. *Opening the record of science: making scholarly publishing work for science in the digital era*. International Science Council, Paris, France.

International Institute for Applied Systems Analysis-International Science Council. 2021. *Synthesis report: Pathways to a sustainable post-COVID world – reports from the IIASA-ISC consultative platform*, International Science Council, Paris, France.

International Institute for Applied Systems Analysis-International Science Council. 2021. *Rethinking Energy Solutions: Pathways to a sustainable post-COVID world – reports from the IIASA-ISC consultative platform*, International Science Council, Paris, France.

International Institute for Applied Systems Analysis-International Science Council. 2021. *Resilient Food Systems: Pathways to a sustainable post-COVID world – reports from the IIASA-ISC consultative platform*, International Science Council, Paris, France.

International Institute for Applied Systems Analysis-International Science Council. 2021. *Strengthening Science Systems: Pathways to a sustainable post-COVID world – reports from the IIASA-ISC consultative platform*, International Science Council, Paris, France.

International Institute for Applied Systems Analysis-International Science Council. 2021. *Enhancing Governance for Sustainability: Pathways to a sustainable post-COVID world – reports from the IIASA-ISC consultative platform*, International Science Council, Paris, France.

ISC-UNDRR-IRDR. 2021. *A Framework for Global Science: In Support of Risk-informed Sustainable Development and Planetary Health* [eds Handmer, J., Vogel, C., Payne, B., Stevance, A.-S., Kirsch-Wood, J., Boyland, M., Han, Q., Lian, F.]. Paris, France, International Science Council; Geneva, Switzerland, United Nations Office for Disaster Risk Reduction; Beijing, China, Integrated Research on Disaster Risk. DOI: 10.24948/2021.07.

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